PATENT ABSTRACTS OF JAPAN

(51)Int.Cl.   H04N 7/08

                               H04N 7/081

(21)Application number : 09-295044   (71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

(22)Date of filing :   01.09.1997   (72)Inventor : HIRAI JUNICHI

SHIMOJI TATSUYA

KUSUMI TAKENORI

OKAMURA KAZUO

INOUE SHINJI

OOASHI MASAHIRO

KAKIUCHI TAKASHI

MIYABE YOSHIYUKI

NAMIKATA IKUO

KOZUKA MASAYUKI

MIMURA YOSHISUKE

TAKAO NAOYA

MORI TOSHIYA

(54) **DIGITAL BROADCASTING EQUIPMENTRECEIVERDIGITAL BROADCASTING SYSTEMAND RECORDING MEDIUM APPLIED TO RECEIVER**

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a digital broadcasting equipment that uses a broadcast program behaving as if performing interactively 2-way communicationits receivera digital broadcasting systemand recording medium recording a program for the receiver.

SOLUTION: A contents storage section 5102 of a digital broadcasting system 5101 stores a plurality of contents including moving image data and control information denoting other contents concerning link destinations of the contents. A data multiplexer section 5103 multiplexes repetitively control information included in the same contents with respect to one set of moving image dataand a transmission section 5106 transmits moving image data on which the control information is multiplexed. The receiver 5121 receives and reproduces the contents while selecting them interactively.

CLAIMS

[Claim(s)]

[Claim 1]A broadcast device which broadcasts an interactive program which consists of two or more contents by which linking was carried out mutuallycomprising:

A video data.

A content storing means which memorizes two or more contents which include respectively control information which shows other contents used as a link destination of the contents.

A transmitting means which transmits each video data which repeated and carried out multiplex [of the control information included in the same contents as the video data] to a video data of 1and in which multiplex [of the control information] was carried out.

[Claim 2]The broadcast device comprising according to claim 1:
The 1st memory measure that memorizes a video data in which said content storing means is included in said two or more contents.
The 2nd memory measure that memorizes control information included in said two or more contents.
A structure table memory measure which memorizes a structure table showing a correspondence relation with control information memorized by a video data memorized by the 1st memory measure and the 2nd memory measure.

[Claim 3]The broadcast device comprising according to claim 2:
A multiplexing means which generates a multiplexed stream which said transmitting means read two or more video datas memorized by the 1st memory measure and two or more control information memorized by the 2nd memory measure as a digital data streamrespectivelyand multiplexed them.
A multiloop control means "repeats and carries out multiplex [of the control information corresponding to each video data] while multiplexing two or more video datas" with reference to said structure table to control a multiplexing means like.
A delivery means which puts a multiplexed stream generated by multiplexing means on a digital broadcast waveand sends it out.

[Claim 4]Said content storing means is further provided with the 3rd memory measure that memorizes voice data corresponding to each video dataand said structure table memory measureThe broadcast device according to claim 3wherein it memorizes a correspondence relation of voice dataa video dataand

control information which are included in each contents and said multiplexing means multiplexes voice data of the 3rd memory measure to a multiplexed stream further.

[Claim 5]Said contents including two or more control information said each control informationIncluding link information which shows contents of a link destinationand a hour entry which shows whether it is effective in which time zone of the area within regeneration time of a video data corresponding to the control information concernedsaid multiloop control meansThe broadcast device according to claim 3 controlling a multiplexing means to carry out multiplex [of the control information] to a video data repeatedly over the effective riding time.

[Claim 6]The broadcast device according to claim 5wherein said multiloop control means controls a multiplexing means to carry out multiplex [of the control information] to a video data rather than the effective riding time further repeatedly from before sufficient fixed time for a receiving set to process control information.

[Claim 7]The broadcast device according to claim 5wherein said multiloop control means adds a version number to two or more control information included in contents further according to said effective riding time.

[Claim 8]Said contents including two or more control information said structure table memory measureAbout each of two or more control information included in contentscontrol information whether it is effective including a shown hour entry table in which time zone of the area within regeneration time of a video data said multiloop control meansBased on a hour entry tablecontrol a multiplexing means to carry out multiplex [of the control information] to a video data repeatedly over the effective riding timeand said multiloop control meansThe broadcast device according to claim 3 adding a version number to two or more control information included in contents according to said effective riding time.

[Claim 9]The broadcast device according to claim 3wherein said control information on at least 1 includes additional information which shows a character or a graphics image by which a superimposed display is carried out to a video

data.

[Claim 10]The broadcast device comprising according to claim 3:

Link information each control information memorized by said 2nd memory measure indicates contents of a link destination to be.

An auxiliary image showing a menu item for every link destination.

[Claim 11]The broadcast device comprising according to claim 10:

Two or more additional information which shows a character or a graphics image in which the superimposed display of said control information on at least 1 is carried out to a video data.

Script information which validates which additional information reflecting user's operation in a receiving set.

[Claim 12]The broadcast device comprising according to claim 10:

At least two sets of a set with which said control information on at least 1 contains said link information and an auxiliary image.

Initial information which shows an effective set according to an initial state of contents playback in which the control information concerned in a receiving set is included.

Script information which changes an effective set reflecting user's operation in a receiving set.

[Claim 13]The broadcast device according to claim 12wherein said set includes additional information which shows further a character or a graphics image by which a superimposed display is carried out to a video data.

[Claim 14]A broadcast device which broadcasts an interactive program which consists of two or more contents by which linking was carried out mutuallycomprising:

The 1st memory measure that memorizes two or more video datas which are the elements of contents which have an identifier and constitute an interactive

program.

The 2nd memory measure that is other elements of contents which have an identifier and constitute an interactive programand memorizes two or more control information including link information which shows an identifier of control information on link destination contents.

A structure table memory measure which memorizes a structure table showing a correspondence relation with control information memorized by a video data memorized by the 1st memory measure and the 2nd memory measure for every contents.

Two or more video datas memorized by the 1st memory measure and two or more control information memorized by the 2nd memory measure are read as a digital data streamrespectivelyA multiplexing means which generates a multiplexed stream which multiplexed themand said structure table are referred to "while multiplexing two or more video datasA multiloop control means which repeats and carries out multiplex [of the control information corresponding to each video data]" to control a multiplexing means likeand a delivery means which puts a multiplexed stream generated by multiplexing means on digital broadcastingand sends it out.

[Claim 15]The broadcast device according to claim 14 which is provided with the following and characterized by said multiplexing means reading a video data and control information from the 1st and 2nd memory measure according to the multiplex starting pointrespectively.

A 1st determination means by which said multiloop control means determines the multiplex starting point to a multiplex stream of a video data of each contents shown in a structure table.

A 2nd determination means to determine two or more multiplex starting points to a multiplex stream that multiplex [of the control information] is repeatedly carried out to a corresponding video data to control information included in each contents shown in a structure table.

[Claim 16]Each control information memorized by said 2nd memory measureThe broadcast device according to claim 15 characterized by determining two or more multiplex starting points for every control information so that link information which shows contents of a link destinationand a hour entry which shows effective riding time of control information may be recorded and said 2nd determination means may repeat and carry out multiplex [of the control information between effective riding time].

[Claim 17]Further said multiloop control means to two or more control information included in the same contents. The broadcast device according to claim 16wherein it has a version grant means to give a version number according to effective riding time which the hour entry shows and said multiplexing means carries out multiplex [of the control information to which a version number was given] according to the multiplex starting point.

[Claim 18]The broadcast device according to claim 16 determining the multiplex starting point that said 2nd determination means means will carry out multiplex [of the control information] to a video data rather than the effective riding time further repeatedly from before sufficient fixed time for a receiving set to process control information.

[Claim 19]The broadcast device according to claim 15 which is provided with the following and characterized by said multiplexing means generating a multiplexed stream using system information and the 1st and 2nd identification information. A system-information memory measure which memorizes system information for said multiloop control means to specify said multiplex stream in a digital broadcast wave further including stream ID for stream ID for each video dataand control information.

An identification information grant means to change an identifier of a video dataand an identifier of control information into the 1st identification information and the 2nd identification informationrespectivelyand to give a video data and control information based on memorized system information.

A link destination signal transduction means to change link information of each navigation table into a video data of contents of a link destinationand the 1st and 2nd identification information of control informationrespectively.

[Claim 20]The broadcast device according to claim 19wherein said 1st identification information is expressed with individual stream ID by video data and said 2nd identification information is expressed with stream ID common to control information in contentsand a parameter individual to control information in contents.

[Claim 21]Said contents including two or more control information said each control informationIncluding link information which shows contents of a link destinationand a hour entry which shows whether it is effective in which time zone of the area within regeneration time of a video data corresponding to the control information concernedsaid multiloop control meansThe broadcast device according to claim 20 controlling a multiplexing means to carry out multiplex [of the control information] to a video data repeatedly over the effective riding time.

[Claim 22]Said contents including two or more control information said structure table memory measureAbout each of two or more control information included in contentscontrol information whether it is effective including a shown hour entry table in which time zone of the area within regeneration time of a video data said multiloop control meansBased on a hour entry tablecontrol a multiplexing means to carry out multiplex [of the control information] to a video data repeatedly over the effective riding timeand said multiloop control meansThe broadcast device according to claim 20 adding a version number to two or more control information included in contents according to said effective riding time.

[Claim 23]The broadcast device according to claim 21wherein said multiloop control means controls a multiplexing means to carry out multiplex [of the control information] to a video data rather than the effective riding time further repeatedly from before fixed time with a sufficient receiving set for control information to process.

[Claim 24]The broadcast device according to claim 21wherein said multiloop control means adds a version number to two or more control information included in contents further according to said effective riding time.

[Claim 25]The broadcast device comprising according to claim 19:

Link information each control information memorized by said 2nd memory measure indicates contents of a link destination to be.

An auxiliary image showing a menu item for every link destination.

[Claim 26]. Occupy said multiloop control means to said multiplexed stream for every contents further. Have a band assignment table showing a zone of a digital data stream of control information by which repeating transmission is carried outand said 2nd determination meansThe broadcast device according to claim 15wherein it determines the multiplex starting point of control information according to a zone of a band assignment table and said multiplexing means multiplexes a digital data stream according to a zone of a band assignment table.

[Claim 27]Have an identifierhave the 3rd memory measure that memorizes two or more voice data which is the elements of each contents which constitute an interactive programand said structure tableThe broadcast device according to claim 14wherein correspondence relation between said video datacontrol informationand voice data is shown and said multiplexing means multiplexes voice data to a multiplexed stream further for every contents.

[Claim 28]A broadcast device comprising:

It is a broadcast device which broadcasts an interactive program which consists of two or more contents by which linking was carried out mutuallyand they are two or more video datas.

An image storing means which memorizes two or more still picture data.

A control information storing means which is an element of contents which use an animation and a still picture as a baserespectivelyand memorizes control information on two or more 1st and 2nd types including link information which shows contents of a link destination from the contents concerned.

The 1st structure table showing correspondence relation between a video data and control information on the 1st type for every contentsWhile carrying out multiplex [of the video data indicated to be a structure table memory measure which memorizes the 2nd structure table showing correspondence relation between still picture data and control information on the 2nd type to the 1st structure table]The 1st multiplexing means that generates the 1st multiplexed stream that repeated and carried out multiplex [of the control information on the 1st type corresponding to the video data] to that of a video dataThe 2nd multiplexing means that generates the 2nd multiplexed stream that repeated and carried out multiplex [of two or more still picture data shown in the 2nd structure table] with control information on the 2nd typeand a delivery means which puts the 1st and 2nd multiplexed stream generated by the 1st and 2nd multiplexing means on a digital broadcast waveand sends it out.

[Claim 29]A receiving set which receives a broadcast wave including an interactive program which consists of two or more contents by which linking was carried out mutuallycomprising:

Said broadcast wave contains a multiplex stream which repeated and multiplexed control information which shows a link to other contents to several different video datasand said receiving set is a video data of 1 from said broadcast wave.

An extraction means to extract control information in the same contents as the video data.

Holding mechanism holding extracted control information.

A control means which controls an extraction means to extract other contents shown in a reproduction means which reproduces an extracted video data and outputs a video signala control means which receives user's operation which directs a change of contentsand control information held at holding mechanism according to user's operation.

[Claim 30]The receiving set according to claim 29wherein said one contents correspond to several control information from which earned hours differ including earned-hours information which shows a period when the control information of said control information is effective and said reproduction means reproduces an auxiliary image held at holding mechanism during the shelf-life.

[Claim 31]Said one contents correspond to several different control informationand earned hours each control informationThe receiving set according to claim 29 controlling an extraction means to extract control information in which it has a version number according to a shelf-lifeand said control means has the following version number when one control information is extracted by extraction means.

[Claim 32]The receiving set according to claim 29 which it has the followingand said reproduction means reproduces a video data incorporated by an incorporation meansand is characterized by said holding mechanism holding control information incorporated by an incorporation means.

The 1st discriminating means that distinguishes the 1st identification information by which the 1st identification information and the 2nd identification information are given to said video data and control informationrespectivelyand said extraction means is given to a video data in said broadcast wave including the 1st and 2nd identification information thatas for said control informationexpresses contents of a link destination.

The 2nd discriminating means that distinguishes the 2nd identification information given to control information in said broadcast wave.

An incorporation means to incorporate video data concerned and control information when a discriminated result of the 1st and 2nd discriminating means is the specific identification information directed to a control means.

[Claim 33]Multiplex [of said multiplex stream] is carried out by entry information which shows the 1st and 2nd ********** of contents which should be reproduced firstand said control meansWhen selection operation of a multiplex stream is

received from a userin a control meanspoint for an extraction means to extraction of entry informationand said extraction meansAn entry information extraction means to extract entry information from a multiplex stream in response to directions from said control meansThe receiving set according to claim 32wherein it has an entry information memory measure which memorizes entry information extracted by an entry information extraction means and said control means directs the 1st and 2nd identification information contained in entry information to the aforementioned picking ****** as said specific identification information.

[Claim 34]Said link information link destination contents including an identifier of a video data and an identifier of control information which are shown said 1st and 2nd identification informationAre a video data in a multiplex streamand ID of a digital data stream showing control informationandrespectively to said multiplexed stream. Multiplexand repeating transmission of the conversion table showing correspondence relation between an identifier of a video data and the 1st identification information and correspondence relation between an identifier of control information and the 2nd identification information is carried outand said extraction meansThe receiving set according to claim 32wherein it extracts this conversion tableand said control means changes into the 1st identification information an identifier of a video data contained in link information with reference to this conversion tablechanges an identifier of control information into the 2nd identification information and directs it for an extraction means.

[Claim 35]Said control information including link information which shows contents of a link destinationand an auxiliary image including a menu item picture for every link destination said reproduction meansA video data reproduction means which reproduces a video data which took and was incorporated by ******Have an image restoration means to reproduce so that an auxiliary image held at holding mechanism may be superimposed on said video dataand said control meansThe receiving set according to claim 32wherein it receives an user choice to a menu item picture and said control means distinguishes the 1st

identification information of contents of a link destinationand the 2nd identification information according to a menu item picture and link information by an user choice.

[Claim 36]The receiving set according to claim 35 reproducing said reproduction means including additional information said control information indicates a character image or a graphics image to be further so that a character image or a graphics image which additional information held further at holding mechanism shows may be superimposed on said video data.

[Claim 37]Said one contents correspond to several different control informationand earned hours each control informationThe receiving set according to claim 36 controlling an extraction means to extract control information in which it has a version number according to a shelf-lifeand said control means has the following version number when one control information is extracted by extraction means.

[Claim 38]The receiving set according to claim 36wherein said one contents correspond to several control information from which earned hours differ including earned-hours information which shows a period when the control information of said control information is effective and said reproduction means reproduces an auxiliary image held at holding mechanism during the shelf-life.

[Claim 39]Two or more control information corresponding to said one contentsThe receiving set according to claim 38 characterized by incorporating so that control information which has the following version number may be incorporatedand controlling a means when it has a version number according to a shelf-lifesaid control means is taken and one control information is incorporated by ******.

[Claim 40]Two or more additional information which shows a character or a graphics image in which the superimposed display of said control information on at least 1 is carried out to a video dataWhich additional information including script information to validate reflecting user's operation in a receiving set said control meansThe receiving set according to claim 36wherein it determines

effective additional information by interpreting and performing a script held at holding mechanism and said reproduction means reproduces a character or a graphics image about effective additional information according to an interpretation executed result by a control means.

[Claim 41]Said control information on at least 1 a set containing said link information and an auxiliary image At least two setsInitial information which shows an effective set according to an initial state of contents playback in which the control information concerned in a receiving set is includedAn effective set including script information to change reflecting user's operation in a receiving set said control meansThe receiving set according to claim 36wherein it determines an effective set by interpreting and performing initial information and a script which were held at holding mechanism and said reproduction means reproduces an auxiliary image about an effective set according to an interpretation executed result by a control means.

[Claim 42]The receiving set according to claim 29wherein said said multiplex stream extracts voice data further corresponding to a video data from said broadcast wave in said extraction means including voice data corresponding to a video data and said reproduction means reproduces voice data extracted further.

[Claim 43]The 1st discriminating means that is provided with the following and from which said extraction means distinguishes the 1st identification information given to a video data in said broadcast waveThe 2nd discriminating means that distinguishes the 2nd identification information given to control information in said broadcast waveWhen a discriminated result of the 1st and 2nd discriminating means is the specific identification information directed to a control meanshave an incorporation means to incorporate video data concerned and control informationand said reproduction meansA receiving set which reproduces a video data incorporated by an incorporation meansand is characterized by said holding mechanism holding control information incorporated by an incorporation means.

Are a broadcast wave including an interactive program which consists of two or

more contents by which linking was carried out mutually a receiving set to receiveand said broadcast waveIncluding a multiplex stream which repeated and multiplexed control information which shows a link to other contents to two or more video datasto said video data and control information. The 1st identification information and the 2nd identification information are givenrespectivelysaid control information contains the 1st and 2nd identification information showing contents of a link destinationand said receiving set is a video data of 1 from said broadcast wave.

An extraction means to extract control information in the same contents as the video data.

Holding mechanism holding extracted control information.

A control means which controls an extraction means to extract other contents shown in a reproduction means which reproduces an extracted video data and outputs a video signala control means which receives user's operation which directs a change of contentsand control information held at holding mechanism according to user's operation.

[Claim 44]Said link information link destination contents including an identifier of a video data and an identifier of control information which are shown said 2nd identification informationAre an identifier of control information and to said multiplexed stream. A conversion table showing correspondence relation between an identifier of a video data and the 1st identification information multiplexesand repeating transmission is carried outextract said extraction meansand this conversion table said control meansThe receiving set according to claim 43 characterized by what an identifier of a video data contained in link information is changed into the 1st identification information with reference to an extracted conversion tableand is directed for an extraction means.

[Claim 45]The receiving set according to claim 44wherein said 1st identification information contains a packet identifier specified to an MPEG 2 standard.

[Claim 46]The receiving set according to claim 44 which ****** that said 1st

identification information is the combination of a packet identifier specified to an MPEG 2 standardand other parameters.

[Claim 47]Are a broadcast wave including an interactive program which consists of two or more contents by which linking was carried out mutually a receiving set to receiveand said broadcast waveThe 1st multiplex stream showing two or more stream base contents including a video data and the 1st control informationTwo or more page base contents including still picture data and the 2nd control information including the 2nd included multiplex stream the 1st multiplex streamRepeatedlycover a regeneration time belt of a video dataand multiplex [of the 1st control information that shows a link to other contents] is carried outand the 2nd multiplex streamRepeatedlymultiplex [of two or more still picture data and two or more 2nd control information] is carried outand said receiving setWith any of a video data and still picture data which are contained in contents of 1 from said broadcast wave they are. An extraction means to extract any of the 1st and 2nd control information they areand holding mechanism holding any of the 1st and 2nd extracted control informationA judging means contents made into an object of an extraction means judge whether they are stream base contents or they are page base contents to beWhen judged with an extracted video data being reproduceda video signal being outputtedand their being page base contentswhen judged with their being stream base contentsA reproduction means which reproduces extracted still picture data and outputs a video signalA receiving set provided with a control means which controls an extraction means to extract other contents shown in a control means which receives user's operation which directs a change of contentsand the 1st or 2nd control information held at holding mechanism according to user's operation.

[Claim 48]Including a broadcast device and a receiving setusing a broadcast waveare dialogism a broadcasting system to realize and said broadcast deviceA content storing means which includes respectively a video data and control information which shows other contents used as a link destination of the contents and which memorizes two or more contentsIt repeats and carries out multiplex

[of the control information included in the same contents as the video data] to a video data of 1Control information is provided with a transmitting means which transmits each video data by which multiplex was carried outand it said receiving setAn extraction means to extract a video data of 1and control information in the same contents as the video data from said broadcast waveHolding mechanism holding extracted control informationand a reproduction means which reproduces an extracted video data and outputs a video signalA broadcasting system which ****** having a control means which controls an extraction means to extract other contents shown in a control means which receives user's operation which directs a change of contentsand control information held at holding mechanism according to user's operation.

[Claim 49]A receive section which receives a broadcast wave including an interactive program which consists of two or more contents by which linking was carried out mutuallyA storage applied to a receiving set which has an extraction part which extracts a digital data stream of 1 from said broadcast waveand a regenerating section which reproduces a video data and outputs a video signalAn extraction step which extracts a video data of 1and control information in the same contents as the video data from said broadcast waveA storing step which stores extracted control information in a memory inside a receiving setRegeneration steps which reproduce an extracted video data and output a video signalWhen a judgment step which judges whether user's operation which directs a change of contents was made to a receiving setand user's operation which directs a change of contents are madeA storage currently recording a program which makes a computer in a receiving set perform processing which has a control step which controls an extraction part to extract other contents shown in control information stored in a memory.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to a digital broadcasting system.

[0002]

[Description of the Prior Art]These daysdigital satellite broadcasting is started and many programs are sponsored using many channels. Multi-channel-ization in digital satellite broadcasting is realized by multiplexing a multiple channel to one zone. The art of a transport stream [in / in this multiplexing / an MPEG 2 (Moving Picture Experts Group 2) standard] is used. Specificallyit writes in ISO/IEC standard 13818 to 1 (MPEG 2 system) written standards.

[0003]

[Problem(s) to be Solved by the Invention]By the wayon the other handvideo information etc. are only transmitted to a target from a transmitting stationand this digital satellite broadcasting does not have dialogism with a receiving side terminal. A variegated program can be enjoyed if the user of a receiving side terminal can choose the video information interactively himself according to the contents of the video information transmitted.

[0004]The purpose of this invention is to provide the recording medium which recorded the program applied to the digital broadcasting system served as if it was communicating video information in both directions interactivelyits receiving seta digital broadcasting systemand a receiving set using the video information etc. which are broadcast in one way.

[0005]

[Means for Solving the Problem]A digital broadcasting system which attains the above-mentioned purpose is an interactive program which consists of two or more contents by which linking was carried out mutually a broadcast device to broadcastand A video dataA content storing means which memorizes two or more contents which include respectively control information which shows other contents used as a link destination of the contentsMultiplex [of the control information included in the same contents as the video data] is repeated and

carried out to a video data of 1and control information is provided with a transmitting means which transmits each video data by which multiplex was carried outand is constituted.

[0006]The 1st memory measure that memorizes here a video data in which said content storing means is included in said two or more contentsIt may constitute so that it may have a structure table memory measure which memorizes a structure table showing correspondence relation between the 2nd memory measure that memorizes control information included in said two or more contentsand control information memorized by a video data memorized by the 1st memory measure and the 2nd memory measure.

[0007]Two or more video datas in which said transmitting means was memorized by the 1st memory measure hereA multiplexing means which generates a multiplexed stream which read two or more control information memorized by the 2nd memory measure as a digital data streamrespectivelyand multiplexed themSaid structure table is referred to "while multiplexing two or more video datasIt may constitute so that it may have a multiloop control means which repeats and carries out multiplex [of the control information corresponding to each video data]" to control a multiplexing means likeand a delivery means which puts a multiplexed stream generated by multiplexing means on a digital broadcast waveand sends it out.

[0008]Said content storing means is further provided with the 3rd memory measure that memorizes voice data corresponding to each video dataand here said structure table memory measureA correspondence relation of voice dataa video dataand control information which are included in each contents may be memorizedand said multiplexing means may be constituted so that voice data of the 3rd memory measure may be multiplexed to a multiplexed stream.

[0009]Since according to the above-mentioned composition multiplex [of the control information] is repeatedly continued and carried out to a regeneration time region of a video data and it is transmitted with a video datait is renewableswitching contents interactively according to user's operation in a

receiving set. That isthis digital broadcasting system can sponsor an interactive program using broadcast of one way.

[0010]

[Embodiment of the Invention]

0. Explain the outline about the interactive program realized by the broadcast in advance of explanation of each composition of the broadcast device in the digital broadcasting system concerning outline explanation this invention of this inventionand a receiving set.

[0011]The broadcast device in a digital broadcasting system broadcasts the interactive program which consists of two or more contents by which linking was carried out mutually. On the other handa receiving set is reproducedreceiving an interactive program and switching contents interactively with a user. Contents are the information used as the component of an interactive programand the unit of the reproduction which can be switched by a user's interactive operation in a receiving set is said here. There are two types of these contents called stream base contents and page base contents. Stream base contents are contents which make an animation a subjectand page base contents are contents which make a still picture a subject.

[0012]Drawing 1 shows the example of two or more contents reproduced while changing with a receiving set. The figure to which the left-hand side of drawing 1 and right-hand side were expandedrespectively is shown in drawing 2 and drawing 3. Drawing 2 and drawing 3 are continuing by the right and left of an A-A'line. In these figures100S-105S105S'and 105S" show stream base contentsand 100P-106P show page base contentsrespectively.

[0013]The contents 100S express the animation and sound showing the tourist guidebook in the world of introducing every country in the worldsuch as ChinaJapanand Egyptone by oneand the menu which consists of two or more button images (it is only called a button below) which responded to the country under introduction. Each button supports other contents of a link destinationand is the target of user's operation. With the figuresome scenes (or frame) in the

animation which it shows to each country are typically indicated to time order. For examplescene 100S1 expresses a Chinese tourist guidebookand scene 100S2 expresses the Japanese tourist guidebook. scene 100S1 to scene 100S2 -- it changedsimultaneously the menu in a scene has also changed from the menu for China to the menu for Japan. the contents of the link destination of each button in a menu -- a Chinese tourist guidebook (outside of a figure) -- business -- it has changed from contents to the contents for tourist guidebooks of Japan.

[0014]The contents 101S102Sand 103S express the same animation and sound as the contents 100Seach different menu according to the country under introductionand character imagessuch as prehension explanation of the country under introduction. The contents 104S express the animation and sound showing the Nippon Travel Agency guidance which introduces every place in Japansuch as Osaka and Naraone by oneand the menu which consists of a button according to the area under introduction.

[0015]The contents 105S105S'and 105S" express the same animation and sound as the contents 104Sand each different menu according to the area under introduction. The contents 100P express the still picture showing the weather report in the worldand the button which showed link destination contentssuch as JapanChinaand Hong Kongaccording to the country.

[0016]The contents 101P-106P express similarly the still picture showing the weather report of the country of the contents of a link destinationor the areaand the menu which consists of a button corresponding to a link destination. The interactive program containing the above contents is reproduced the contents of a user desire being interactively switched in a receiving set. Each arrow of the figure shows the example of a change of the contents in a receiving set.

[0017]For examplewhen the "weather" button is chosen and become final and conclusive by user's operation during reproduction of scene 100S1a receiving set is switched to reproduction of the contents 100P of a link destination as shown in the arrow in drawing 2. Therebythe user can see the main menu of a still picture which tells the weather in the world. When the button "returns" during

reproduction of the contents 100P is chosen and become final and conclusive by the user in this statea receiving set is switched to reproduction of scene 100S2 under broadcast at that time as shown in the arrow.

[0018]Thusthe change between stream base contents and page base contents is performed. For examplewhen "traffic" button is chosen and become final and conclusive by user's operation during reproduction of scene 101S1 (with the sub menu which makes the traffic and stay to Japan a menu item)a receiving set is switched to reproduction of scene 102S1 of a link destination as shown at the arrow. Therebythe user can acquire the text showing the prehension explanation about the traffic to Japan. When the button of scene 101S1 "returning" is chosen and become final and conclusive in this statea receiving set is switched to reproduction of scene 101S2.

[0019]Thusthe change between stream base contents is performed. Furthermorewhen the "Osaka" button is chosen and become final and conclusive during reproduction of the contents 104P (main menu which tells the weather of Japan) in drawing 3a receiving set is switched to reproduction of the contents 106P like the arrow of the figure. Therebythe user can get the weather report of Osaka. When the button of the contents 106P "returning" is chosen and become final and conclusive in this stateit switches to reproduction of the contents 104P.

[0020]Thusthe change between page base contents is performed. The above is outline explanation of this invention. The composition of the digital broadcast system which realizes hereafter the interactive program which consists of stream base contents in a 1st embodimentA 2nd embodiment explains the composition which realizes the interactive program in which the contents of both types are intermingled by a 3rd embodiment in the composition which realizes the interactive program which consists of page base contents.

1. Explain the principle in advance of explanation of the composition of the digital broadcasting system about the interactive program which consists of 1st embodiment stream base contents (it only abbreviates to contents in this embodiment).

[0021]The contents 100S shown in drawing 1 and drawing 2 are expressed from two or more navigation information showing the menu which consists of the video data and voice data showing the animation showing the tourist guidebook in the worldand a soundand two or more buttons which responded to the country under introductionor supplementary explanation. Navigation information can be established for every arbitrary sections here reflecting the contents of the animation. For examplethe navigation information for the sections of the tourist guidebook scene of China containing scene 100S1 (it is considered as the version 1)They are the navigation information for the sections of the tourist guidebook scene of Japan containing scene 100S2 (it is considered as the version 2)the navigation information for the sections of the tourist guidebook scene of Egypt (it is considered as the version N)etc.

[0022]The contents 101S - the contents 103S can share the video data and voice data in which the tourist guidebook in the same world as the contents 100S is shownand can have two or more navigation information which reflected the contents of the animation for every arbitrary sectionsrespectively. It is because enabling the change to stream base contents from the contents under present reproduction in a receiving set is broadcasting navigation information as follows with the broadcast device in addition to a video data and voice data.

[0023]That isrepeating transmission of the navigation information is carried out over the regeneration time belt of a video data by a broadcast device. Since navigation information is prepared for every section of a video data in that caserepeating transmission of the navigation information is carried out within the section. For examplein the section of the tourist guidebook scene of China containing the above-mentioned scene 100S1repeating transmission of the navigation information of the version 1 is carried out in the regeneration time belt. In the section of the tourist guidebook scene of Japan containing scene 100S2repeating transmission of the navigation information of the version 2 is carried out in a regeneration time belt. In the section of the tourist guidebook scene of Egyptrepeating transmission of the navigation information of the version

N is carried out.

[0024]It is a time of a contents change occurring in a receiving seta time of starting reception from the broadcast middle of an interactive programetc. to carry out repeating transmission of the same navigation informationand it is for making it possible to receive the navigation information of a change place immediately. When navigation information is dynamically set up for every section of a video datait is for making the newest navigation information into ability ready for receiving at the time of a contents change.

[0025]Thusoriginally in the broadcasting system of a uni directionalinteractive nature called the stream base-contents change to operation of the user in a receiving set is realized.

1-1. Digital broadcasting system drawing 4 is a block diagram showing the composition of the digital broadcasting system in a 1st embodiment.

[0026]This digital broadcasting system contains the digital broadcasting system 5101 and two or more receiving sets. In the figureone set only of the receiving set 5121 is illustrated on behalf of two or more receiving sets. The interactive program which consists of the above-mentioned stream base contents (it abbreviates to contents in this embodiment) by which linking was carried out mutually in this digital broadcasting system is broadcast from the digital broadcasting system 5101It has composition reproduced while switching contents interactively in the receiving set 5121.

[0027]According to this embodimentin order to explain plainlysuppose that the composition of the digital broadcasting system 5101 and the receiving set 5121 is explained using the example of the interactive program which consists of the four contents 0-3 shown in drawing 5. The contents 0 consist of the scenes 01a-01hand are expressed by the animation and sound (not shown) which tell the weather report of the Kansai district.

[0028]The scene 01a is an opening scene. As for the scene 01bthe superimposed display of the buttons (button image) 02b and 03b is carried out on an animation. Linking of the buttons 02b and 03b is carried out to the contents 1

and the contents 2respectivelyand they are the targets of a user's contents switching operation in the receiving set 5121. The scenes 01c-01h are also the same.

[0029]moreover -- the contents 1 consist of the scenes 11a-11h -- the same animation as the weather report of the contents 0and a sound (not shown) -- in additionthe text 13b-13h is added as shown in the figure. The text 13b-13h is information supplementary to animation scenessuch as a maximum air temperaturethe lowest temperaturehumidityand probability of precipitation. The button 12b in which linking of the scene 11b was carried out to the contents 0and the text 13b are displayed on an animation. The scenes 11c-11h are also the same.

[0030]The contents 2 are expressed by the animation and sound (not shown) which tell the weather report of the Kanto district. To the contents 3the button 22b in the scene 21b is carried outand linking of the button 23b is carried out to the contents 0respectively. The contents 3 are expressed by the same animation and sound (not shown) as the contents 2and text is added further. Linking of the button 32b in the scene 31b is carried out to the contents 2.

[0031]The interactive program which consists of the four above-mentioned contents is reproduced as followswhile the contents of a user desire switch interactively in the receiving set 5121. For examplewhen the user's operation which chooses and becomes final and conclusive the button 02b during reproduction of the scene 01b of the contents 0 in the receiving set 5121 is receivedthe receiving set 5121 switches reproduction to the contents 1 of a link destination. In this casesince each contents are multiplexed so that regeneration time may lapthe contents 1 are reproduced from the scene of the change time of the contents 0and the time without being reproduced from a head. Since the contents 1 contain the same animation and sound as the contents 0the user who was looking at the contents 0 will get supplementary explanation of the weather report by text by this change without an animation and a sound changing.

1-2. In digital broadcasting system 5101 drawing 4 the digital broadcasting

system 5101It has the send data storage parts store 5102the multiplex information storage parts store 5104the data multiplexing part 5103the system-information table generation part 5105and the transmission section 5106and the above interactive programs are put on a digital broadcasting waveand are broadcast.

[0032]The send data storage parts store 5102 has storagessuch as a magnetic diskand memorizes the data of all the contents which constitute an interactive program. One contents data is expressed with the presentation information showing a video datavoice dataetc.and the navigation information showing the hyperlink to other contentsa buttontextetc. For examplethe animation and sound of each contents of drawing 5 are contained in presentation informationrespectively. The button currently displayed on the animationtextand the hyperlink further given to the button are contained in navigation information.

[0033]The data multiplexing part 5103 generates the multiplexed stream which multiplexed the contents data memorized by the send data storage parts store 5102. Navigation information is repeated between the regeneration time of the presentation information in the same contentsandspecificallythe data multiplexing part 5103 multiplexes it while multiplexing the presentation information on each contents so that regeneration time may lap. Whenever contents may be switched in a receiving setit is repeating and carrying out multiplex [of the navigation information] in order to be able to receive the navigation information of the contents of a change place certainly.

[0034]The above-mentioned multiplexed stream is generated as a part of transport stream according to regulation of a DVB-SI standard and an MPEG 2 system standard. By digital satellite broadcastinga transport stream is a meeting of two or more digital data streams by which multiplex was carried out into the zone of one subcarrierand has here a zone which is equivalent to a broadcasting channel at 5-6 channels.

[0035]The multiplex information storage parts store 5104 memorizes various parameters required for generation of the multiplexed stream by the data

multiplexing part 5103. The system-information table generation part 5105 generates a system-information table required (it consists of two or more tables) in order that the receiving set 5121 may choose a multiplex stream with reference to the multiplex information storage parts store 5104.

[0036]The transmission section 5106 multiplexes the multiplexed stream generated by the data multiplexing part 5103 and the system-information table generated by the system-information table generation part 5105 to a transport streamand transmits. The various tables on which the information for discriminating the multiplexed stream to which a system-information table expresses the interactive program of this invention from a transport stream is recorded are said here.

1-2-1. In send data storage parts store 5102 drawing 4 the send data storage parts store 5102The presentation information storage part 5107 and the navigation information storage parts store 5108Have the structure information storage part 5109and divide into presentation information and navigation information the data of two or more contents which constitute one interactive program (application)and it is memorizedThe structure information table showing the correspondence relation between presentation information and navigation information furthermore is memorized.

1-2-1-1. The presentation information storage part 5107 presentation information storage part 5107 memorizes the presentation information expressed with the video data contained in each contentsvoice dataetc.

[0037]The video data used for drawing 6 (a) and (b) as presentation information on the contents shown in drawing 5 is shown in every temporal scene (or frame). The video data 5201 shown in drawing 6 (a) has the file name "Video0.m2v"and expresses the animation which recorded the weather report guidance to Kansai. This animation is presentation information shared by the contents 0 shown in drawing 5and the contents 1.

[0038]The video data 5202 shown in drawing 6 (b) has the file name "Video1.m2v"and expresses the animation which recorded the weather report

guidance to Kanto. This animation is the presentation information common to the contents 2 and the contents 3 which were shown in drawing 5. These video datas 5201 and 5202 are memorized by the presentation information storage part 5107 in the form compressed based on 13818 to ISO/IEC 2 (MPEG 2 video) standard etc.respectively. Other forms may be sufficient as the form of image data.

[0039]Drawing 6 (c) and (d) shows an example of the voice data used as presentation information. The voice data 5203 shown in drawing 6 (c) is voice data by which synchronous reproduction is carried out to the video data 5201 which has the file name "Audio0.m2a" and was shown in drawing 6 (a). This sound is presentation information shared by the contents 0 shown in drawing 5and the contents 1.

[0040]The voice data 5204 shown in drawing 6 (d) is voice data by which synchronous reproduction is carried out to the video data 5202 which has the file name "Audio1.m2a" and was shown in drawing 6 (b). This sound is the presentation information common to the contents 2 and the contents 3 which were shown in drawing 5. Such voice data is memorized in the form compressed based on 13818 to ISO/IEC 3 (MPEG 2 audio) standard etc.respectively. Other forms may be sufficient as the form of voice data.

1-2-1-2. The navigation information 5108 navigation-information storage parts store 5108 memorizes the navigation information which constitutes each contents. The hyperlink information to another contents and the earned-hours information which shows the time when the navigation information is effective are included in navigation information. Hyperlink information is described as an object for realizing a user's interactive operation in a receiving set. Earned-hours information is added in order to make it possible to update and upgrade the contents of navigation information one by one according to the contents of presentation informationincluding a video data etc.

[0041]An example of the navigation information corresponding to the scene 01b (correctly scenes 01b-01d) shown in drawing 5 is shown in drawing 7. This navigation information 5301 has the file name "Navi0-0.nif"An object definition

table. (Object DefinitionTable) 5302the hair drier definition table (Handler Definition Table) 5303the hyperlink table (Hyperlink Table) 5304a bit map table (Bitmap.) Table5305 and the earned-hours table (Time Information Table) 5306 are included.

[0042]The object definition table 5302 is the list of the information which shows a typean attributeetc. of the object displayed on the video data contained in presentation information in piles. Specificallyeach of following columns are included. The "object index (Object Index)" column shows the value (object numbers) which distinguishes an object for every object.

[0043]The "type (Type)" column shows the type of an object. There are a button object (Button) for button displaysa still picturea picture object (Picture) for presenting of text to which the hyperlink was given in the type of an object. The buttons 02b and 03b shown in drawing 5 are described as a button object of the object index values 0 and 1 by this examplerespectively. The text 13b shown in drawing 5 is described as a picture object.

[0044]The "X" column and the "Y" column are X and the Y coordinate values which show the display reference position on the display screen of each objectsuch as a button or a picture. The display position of the buttons 02b and 03b which this showed to drawing 5 is defined. The "hair drier (Handler)" column shows the hair drier index value (HandlerIndex) for specifying which is the hair drier corresponding to an object among the hair driers in the hair drier definition table 5303. A hair drier is the program or instruction word described with the programming language which can be performed in the script 5121i.e.a receiving sethere. Especially the hair drier to a button object includes the change command of the contents performed when the button concerned is become final and conclusive by the user's operation in the receiving set 5121 (activate).

[0045]The "normal bit map (Normal Bitmap)" columnTo the display reference position which above-mentioned X and a Y coordinate show in a normal condition (or non selection state). The bit map index value for specifying which bitmapped image (picture showing a button image or still picture information)

should be displayed among the bitmapped images in the bit map table 5305 is shown. A non selection state means the state where the button is not chosen in the receiving set.

[0046]The "focal bit map (Focused Bitmap)" column shows the bit map index value for specifying which bitmapped image (picture showing a button image or still picture information) should be displayed on the display reference position which above-mentioned X and a Y coordinate show in a selective state. A selective state means the state where the button is chosen in the receiving set.

[0047]The hair drier definition table 5303 is recording the hair drier (script) specified as the object of the object definition table 5302. Specificallyeach of following columns are included. The "hair drier index (Handler Index)" column shows the value (hair drier number) which distinguishes a hair drier. The "script (Script)" column shows the hair drier (script) corresponding to a hair drier index. Especially the hair drier to a button object includes the change command of contents like "goto_contents (HyperlinkIndex 0)"as shown in the figure.

[0048]The hyperlink table 5304 shows the argument to the change command of the contents in the hair drier definition table 5303. Specificallyeach of following columns are included. The "hyperlink index (Hyperlink Index)" column shows the value (hyperlink number) which distinguishes a hyperlink. The "contents number" column is the hyperlink information itselfand shows the number of the contents of a link destination as an argument of a change command of contents. For examplethe change command of the contents above-mentioned "goto_contents(HyperlinkIndex 0)"It will performwhen the BOTANO Brzeg concerned changes [in / it is the same as "goto_contents (contents 1)" after alland / the receiving set 5121] into a definite state.

[0049]The bit map table 5305 is recording the bit map data specified as the "normal bit map" of the object definition table 5302and the "focal bit map" column. Specificallythe following columns are included. The "bit map index (Bitmap Index)" column shows the value (bit map number) which distinguishes bit map data. The bit map data showing the button in which the "bit map data (Bitmap

data)" column is displayed on presentation information in pilesor text is recorded. According to a normal conditionas for the button 02b in the scene 01b shown in drawing 5the details of Osaka(a color and thickness have changed so that it may be conspicuous) of the bit map index No. 1 is displayed by "the details of Osaka" of the bit map index No. 0and a selective state. The button 03b indicates "it sees Kanto" of the bit map index No. 3 in a normal condition according to "Kanto is seen" and the selective state of the bit map index No. 2.

[0050]The earned-hours table 5306 is recording the effective start time "start_time" when this navigation information becomes effectiveand the effective finish time "end_time" which becomes invalid. Such time is specified at the relative time (second bit) which set broadcast start time of the interactive program to "0." Drawing 8 shows an example of the navigation information corresponding to the scene 11b shown in drawing 5. This navigation information 5401 has the file name "Navi1-0.nif"and includes the object definition table 5402the hair drier definition table 5403the bit map table 5404and the earned-hours table 5405.

[0051]The object index value of the object definition table 5402 the line of "0"The type of an object is a "button" and the coordinate values of the upper left end position of a display of the object on a display screen are X= 20 and Y= 400When this object is become final and conclusivethe hair drier of a hair drier index value "0" is startedin the state of non selectionthe bit map of a bit map index value "0" is displayedand the selective state shows using the bit map of a bit map index value "1."

[0052]The object index value of the object definition table 5402 the line of "1"The type of an object is a "picture"the coordinate values of the upper left end position of the object on a display screen are X= 300 and Y= 20and it is shown that a bit map index value uses the bit map of "2." As for the hair drier definition table 5403script "goto_entry" by which a hair drier index value is performed when the hair drier of "0" is started is recorded. this script -- receiving set **** among the contents of an interactive program -- it is the command which directs to change

to the contentsi.e.the default contents at the time of a reproduction startwhich should be reproduced at the very beginning.

[0053]The bit map table 5404 is recording the bit map data of a bit map index value "0"1and "2." Among thesethe bit map of a bit map index value "2" expresses the text 13b shown in drawing 5. The earned-hours table 5405 defines that it is time when the effective start time of the navigation information 5401 has passed for 5 seconds since broadcast start timeand effective finish time is time when 65 second has passed since the broadcast start. That isthis navigation information 5401 shows not being usedafter passing 65 seconds since a broadcast start.

[0054]The navigation information 5501 of drawing 9the navigation information 5601 of drawing 10and the navigation information 5701 of drawing 11 also show the example of the navigation information similarly memorized by the navigation information storage parts store 5108The scene 01e of the contents 0 shown in drawing 5respectivelythe scene 11e of the contents 1and the scene 21b of the contents 2 are supported.

1-2-1-3. The structure information storage part 5109 structure information storage part 5109 memorizes the structure information table which is the list of the groups of the presentation information and navigation information which constitute each contentsand entry information. When entry information starts reproduction of an interactive program in the receiving set 5121it has memorized the entry information which shows the number of the entry contents reproduced at the very beginning.

[0055]Drawing 12 is a figure showing an example of the structure information table memorized by the structure information storage part 5109. The structure information table 5801 expresses the group with navigation information as the image data and voice data which are contained in each contents for every contents number. A contents number is a number which identifies one contents uniquely in two or more contents memorized by the send data storage parts store 5102. Howeveralthough a contents number corresponds to one contents in

principleit may correspond to two or more contents exceptionally.

[0056]The line of the contents number 0 in the structure information table 5801 of the figureThe image data from which the contents 0 shown in drawing 5 are discriminated by the file name "Video0.m2v" memorized by the presentation information storage part 5107The voice data identified by a file name "Audio0.m2a"and the file name memorized by the navigation information storage parts store 5108 "Navi0-0.nif"Being constituted by the group with the navigation information identified by "Navi0-1.nif"Navi0-2.nifNavi0-3.nifand "Navi0-4.nif" is shown. Each navigation information written in the "navigation information" column is indicated sequentially from the early thing of effective time of onset. Other lines are the same.

[0057]Drawing 13 is a figure showing an example of the entry information memorized by the structure information storage part 5109. The entry information 5901 expresses that the contents number of the entry contents of the application memorized by the send data storage parts store 5102 is "0."

1-2-2. The multiplex information storage parts store 5104 multiplex-information storage parts store 5104 has memorized the quota information on resourcessuch as an identifier for multiplexing an interactive program in the MPEG2 transport stream for broadcastand a zoneas a multiplex information table.

[0058]Drawing 14 shows an example of the multiplex information table memorized by the multiplex information storage parts store 5104. The multiplex information table 6001 of the figure is a table showing various kinds of identifiers to an interactive program and its componentand assignment of transmission capacity. In the figureeach columns 6002-6005 of "original_network_idtransport_stream_idservice_idevent_id"When carrying out multiplex [of the interactive program] into the MPEG2 transport stream for broadcastthe value of various identifiers assigned to an interactive program is expressed. In a common digital-satellite-broadcasting systemtwo or more MPEG 2 Tran Spoto Stream is transmitted from one satellite (network) using a subcarrier differentrespectively. Each program in one of MPEG2 transport

streamsETS 300 Based on 468 (DVB-SI) standardsoriginal_network_idtransport_stream_idservice_idand event_id are given and multiplex is carried out.

[0059]Hereoriginal_network_id is an identifier which identifies one network uniquely. transport_stream_id is an identifier which identifies one transport stream uniquely in one network. service_id is an identifier which identifies one service uniquely in one transport stream.

[0060]event_id is an identifier which is giving [one] its service and identifies one event uniquely. An event here is equivalent to one program in the conventional analog broadcasting. Multiplex [of the above-mentioned interactive program] is carried out as one event. The event in digital broadcasting says a settlement of some components.

[0061]A component is a stream (Program Element) in 13818 to ISO/IEC 1 (MPEG 2 system) standard identified by one PID (packet identifier)and expresses one of the components of programssuch as an animation and a sound. For examplethe meeting of each image data shown in drawing 12each voice dataand the navigation information in the same contents is a componentrespectively.

[0062]Service puts the time sequence of an event together and is equivalent to one channel in the conventional analog broadcasting. The above-mentioned interactive program becomes a part of one time service. A transport stream is a meeting of two or more services. Although a transport stream and the zone (transmission capacity) of service can consider various assignmentthey are about 5 Mbps(es) etc. per service about 30 Mbpsfor example per transport stream. In this caseone transport stream is equivalent to 5 or 6 channels. Since the transmission capacity of the interactive program as the above-mentioned event contains a video datait changes with numbers of contents.

[0063]The program (event) broadcast through the digital broadcasting system based on a DVB-SI standardIt can be specified as a meaning in all the digital broadcasting systems by specifying the group of above-mentioned

original_network_idtransport_stream_idservice_idand event_id. Details of original_network_idtransport_stream_idservice_idand event_id are given to DVB-SI written standards.

[0064]The "PMT_PID" column 6006 and the "PCR_PID" column 6007 express the value of PID assigned to PMT (Program Map Table) and PCR (Program Clock Reference)respectively. Each stream showing the video data which PMT is one of the system-information tables multiplexed to a transport stream hereand is contained in an eventvoice data (component)etc.It is a table showing a correspondence relation with the identifier (Packet IDentifier:PID) of the packet to which it is transmitted. PCR is one of the system-information tablesis time information which becomes about the standard at the time of carrying out multiplex [of each contents data] to a multiplexed stream in the digital broadcasting system 5101and is the time information used as the standard at the time of reproducing an event in the receiving set 5121. The "NE_component(0)_Bitrate" column 6008 and the "NE_component(0)_pid" column 6009 express the transmission rate assigned to the component which transmits the navigation information table included in the contents 0respectivelyand the value of PID. Below the "NE_component(1)_Bitrate" column is the same. NE is the abbreviation for Navigation Element.

[0065]The "VE_component(0)_Bitrate" column 6010 and the "VE_component(0)_pid" column 6011The transmission rate assigned to the component which transmits the image data corresponding to the value "0x00" of the component tag mentioned laterrespectivelyand the value of PID are expressed. Below "VE_component(1)_Bitrate" is the same. VE is the abbreviation for Video Element.

[0066]The "AE_component(0)_Bitrate" column 6012The "AE_component(0)_pid" column 6013The transmission rate assigned to the component which transmits the image data corresponding to the value "0x00" of the component tag mentioned laterrespectivelyand the value of PID are expressed. Below "AE_component(1)_Bitrate" is the same. AE is the abbreviation for Audio

Element.

[0067]In this embodimentin order to identify navigation informationthe number of PID with which only the number of contents transmits navigation information is securedbut the number of PID which transmits navigation information may be one at least than the number of contentsfor example. In this casewhat is necessary is just to use the combination of PID and other parameters (for exampletable_id_extension by an MPEG 2 standardetc.) as information which identifies navigation information. It may be made to identify similarly about the image data and voice data which are contained in presentation information with the combination of PID and other parameters (for examplestream_id by an MPEG 2 standardetc.). If it carries out like thiseven if the number of usable PID is restricted in the transport streamit will become possible to transmit the contents of a large number beyond the restriction.

1-2-3. In data multiplexing part 5103 drawing 4 the data multiplexing part 5103Firstvarious kinds of identifiers are assigned for every contents memorized by (a) send data storage parts store 5102 (creation of a content identifier assignment table)(b) Give a version number to each navigation information (creation of a version number assignment table)It points to generation of a navigation information table to (c) navigation information table generation part 5111(d) pointing to generation of a system-information table to the system-information table generation part 5105 -- (e)while carrying out multiplex [of each presentation information] according to the table of these so that the regeneration time may lapIn the regeneration time belt of each presentation informationit carries out multiple-times repetition multiplex [of the navigation information corresponding to it]. Thereforethe data multiplexing part 5103 is provided with the multiloop control part 5110the navigation information table generation part 5111and the multiplexing part 5112.

[0068]The above (c) is performed by the navigation information table generation part 5111and the above (a)(b)and (e) is performed by the multiloop control part 5110. The above (d) is performed by the system-information table generation

part 5105.

1-2-3-1. The multiloop control part 5110 multiloop-control part 5110It comprises a CPUa ROM which stored the programRAM of operatingetc.A content identifier assignment table and a version number assignment table are created (above (a)(b))multiplex directions of each presentation information and each navigation information are created according to these tablesand it notifies to the multiplexing part 5112 (above (e)). Multiplex directions contain here the various identifiers which the multiplexing takesthe multiplex starting position in a transport streamaccess speedetc. about the video data and voice data in presentation informationand each navigation information.

[0069]If it says in more detail about (e)the multiloop control part 5110 will create multiplex directions about the video data and voice data in presentation information so that the regeneration time may lap. For examplemultiplex directions are created by making those multiplex starting positions into the time. Multiplex directions are created [continuing and carrying out multiple-times repetition multiplex to the regeneration time belt of the presentation information in the contents in which it is containedand] about navigation information. That istwo or more multiplex starting positions are set up to navigation informationand each multiplex directions are created.

1-2-3-2. The creation multiloop control part 5110 of a multiloop control part 5110:(a) content identifier assignment tableIf started by the transmission section 5106the structure information table and multiplex information table which are memorized by the structure information storage part 5109 and the multiplex information storage parts store 5104 will be readand a content identifier assignment table will be created.

[0070]Drawing 15 shows an example of the content identifier assignment table generated based on the structure information table 5801 shown in drawing 12and the multiplex information table 6001 shown in drawing 14. In the content identifier assignment table 6101it corresponds to each contents number 6102In the "orig_nw_id" column 6103the "ts_id" column 6104the "VE_svc_id" column

6105and the "VE_event_id" column 6106. Each value of the "original_network_id" column 6002 of the multiplex information table 6001the "transport_stream_id" column 6003and the "service_id" 6004 and "event_id" column 6005 is written in. Similarlyeach value of the "service_id" column 6003 and the "event_id" column 6005 is written also in the "AE_svc_id" column 6108 and the "AE_event_id" column 6109. The "NE_svc_id" column 6111 and the "NE_event_id" column 6112 are also the same.

[0071]For every image datathe component tag of a double figures hexadecimal number is given to the "VE_comp_tag" column 6107 sequentially from "0x00"and is written in it. Hereto image data "Video0.m2v"to "Video1.m2v"0x01is given and "0x00" is written in. This component tag is the value which PID was made to correspond to 1 to 1and was freely assigned to itand it is used in order to refer to PID indirectly. As for the component tag of "N"according to this embodimenta value is matched with PID given by "VE_component(N)_pid" of the multiplex information storage parts store 5104respectively. The correspondence relation between a component tag and PID is described in PMT mentioned later. By thisin the receiving set 5121the PID can be distinguished with reference to the component tag described by descriptor of PMTand image data etc. can be acquired. Even when carrying out multiplex [of the interactive program] with other programs by the transmission section 5106 and PID in a system-information table is temporarily rewritten by another valuethere is an effect which can acquire image data certainly and to say.

[0072]If a component tag is not usedspecifying the value of PID as the "VE_comp_tag" column and the "AE_comp_tag" column directly is also considered. In this casewhat is necessary is just to correspond by rewriting the value of PID of these columns in a navigation information table furtherwhen multiplexing to a transport stream by the transmission section 5106 and another value rewrites PID on a system-information table.

[0073]Similarlyfor every voice dataa component tag is given and the "AE_comp_tag" column 6110 is written in. Hereto voice data "Audio0.m2a"to

"Audio1.m2v"0x01is given and "0x00" is written in. In the content identifier assignment table 6101the numerical value of 4 figures of hexadecimal numbers is written in the "NE_id" (navigation information identifier) column 6113increasing every [1] in order of the contents number 6102.

[0074]The "VE_id" column in drawing 15 and the "AE_id" column are the information for identifying page base contents. According to a 1st embodimentsince it is premised on the interactive program which consists only of stream base contentsthe "VE_id" column and the "AE_id" column are not used. It explains henceforth [a 2nd embodiment] in detail.

1-2-3-3. The creation multiloop control part 5110 of a multiloop control part 5110:(b) version number assignment table creates a version number assignment tableafter creation of the content identifier assignment table 6101 finishes.

[0075]the order from that the multiloop control part 5110 was specifically indicated to be to the beginning of the navigation information included in the contents for every contents number with reference to the structure information table 5801 -- from "0" -- "-- every [1"] -- a big version number is given. in addition -- the time of a version number exceeding "31" -- the order from "0" -- "-- every [1"] -- a big version number is given.

[0076]Drawing 16 shows an example of this version number assignment table. For examplethe version number "0x00"0x01and "0x02" is given to the navigation information "Navi0-0.nif" of the contents 0Navi0-1.nifNavi0-2.nifand ... The same may be said of the contents 1-3. The multiloop control part 5110 directs creation of a navigation information table to the navigation information table generation part 5111after creation of the version number assignment table 6201 is completed.

1-2-3-4. Navigation information table generation part 5111 : (c)
The navigation information table generation part 5111If directions of generation of a navigation information table are received from the multiloop control part 5110the navigation information table replaced with the various identifiers showing each component contained in the contents of a link destination in the contents

number of the link destination in a hyperlink table will be generated.

[0077]More specifically the navigation information table generation part 5111When the navigation information memorized by the navigation information storage parts store 5108 is read and the navigation information includes a hyperlink tableThe information on the link destination written by the contents number is changed into the notation of various identifiers with reference to the content identifier assignment table created in the multiloop control part 5110and a navigation information table is generated.

[0078]Furthermorethe navigation information table generation part 5111 memorizes the generated navigation information as a navigation information table by a file name called NVT (a contents numbera version number) to a storage area (not shown). A contents number and a version number are acquired with reference to the structure information table of the structure information storage part 5109and the version number assignment table of the multiloop control part 5110. When the read navigation information does not include a hyperlink tablethe navigation information table generation part 5111 changes only a file nameand memorizes it to a storage area.

[0079]Drawing 17 shows the navigation information table 6301 of the generated file name "NVT (00)." This navigation information table 6301 is generated from the navigation information 5301 of the file name "Navi0-0.nif" shown in drawing 7and supports the scene 01b shown in drawing 5. The navigation information table 6301 includes the object definition table 6302the hair drier definition table 6303the hyperlink table 6304the bit map table 6305and the earned-hours table 6306. Among theseexcept the hyperlink table 6304 and a file nameit is the same as the navigation information 5301 shown in drawing 7.

[0080]In the hyperlink table 6304each contents number of the hyperlink table 5304 of drawing 7 is changed into the notation of the various identifiers indicated in the content identifier assignment table 6101 shown in drawing 15. That "-" is written by columnssuch as "orig_nw_id" etc. of the hyperlink table 6304and the identifier is not indicatedSince the value of the identifier is the sameit means that

record is omitted in the contents to which the navigation information table 6301 belongsand the contents of a link destination.

[0081]In this examplethe "Hyperlink Index 0" column shows the link from the scene 01b to the scene 11b of the contents 1 of the contents 0 shown in drawing 5. Since it is "-" in the "HyperlinkIndex 0" column except the "NE_id" columnthe contents 0 mean that only navigation information tables (NE_id) differ including the same picture as the contents 1 of a link destinationand a sound.

[0082]The "Hyperlink Index 1" column shows the link from the scene 01b to the scene 21b of the contents 2 of the contents 0 shown in drawing 5. Since it is "-" in the "Hyperlink Index1" column except the "VE_comp_tag" "AE_comp_tag" "NE_id" columnthe contents 0It means that the different picture (VE_comp_tag)sound (AE_comp_tag)and navigation information table (NE_id) from the contents 2 of a link destination differ from each other.

[0083]If it belongs to the service from which the contents of a link destination differ temporarilyeach identifier will be indicated to "VE_service_id"AE_service_idand "NE_service_id." By omitting recordwhen the value of an identifier is the same as mentioned abovesize of a navigation information table can be made small. The "VE_id" column in the hyperlink table of drawing 17 and the "AE_id" column are the information for identifying page base contents. By NVT (00)since all the link destinations are stream base contentsthe "VE_id" column and no "AE_id" columns are indicated. The case where link destinations are page base contents is explained henceforth [a 2nd embodiment].

[0084]Drawing 18 shows the navigation information table 6401 of a file name "NVT (10)." This navigation information table 6401 is generated from the navigation information 5401 of the file name "navi1-0.nif" shown in drawing 8and corresponds to the scene 11b of the contents 1 shown in drawing 5. Since a hyperlink table does not exist in the navigation information 5401this navigation information table 6401 is the same contents. Howeverthe link from the scene 11b of the contents 1 to the contents 0 is expressed by the entry information shown in

the hair drier definition table 6403 and drawing 13 of the figure.

[0085]Similarly drawing 19 the navigation information table 6501 of a file name "NVT (01)"Drawing 20 the navigation information table 6601 of a file name "NVT (11)"Drawing 21 shows the navigation information table 6701 of a file name "NVT (20)"The navigation information 5501 of the file name "navi0-1.nif" shown in drawing 9respectivelyIt is generated from the navigation information 5601 of the file name "navi1-1.nif" shown in drawing 10and the navigation information 5701 of the file name "navi2-0.nif" shown in drawing 11.

[0086]It is notified to the multiloop control part 5110 that the navigation information table generation part 5111 ends generation of a navigation information table. Thenthe multiloop control part 5110 directs generation of a system-information table to the system-information table generation part 5105if the notice of the end of navigation information table generation is received. Generation (d) of a system-information table is mentioned later.

1-2-3-5. Firstthe multiloop control part 5110 will read the value of "PCR_PID" from the multiplex information storage parts store 5104and the creation multiloop control part 5110 of multiloop control part 5110:(e) multiplex directions will notify it to the multiplexing part 5112if the notice of the end of generation of a system-information table is received. This is for carrying out multiplex [of the time information (PCR) which becomes about the standard at the time of carrying out multiplex / of each contents data / to a multiplexed stream] to the multiplexing part 5112.

[0087]Nextthe multiloop control part 5110 creates multiplex directions of presentation informationand notifies them to the multiplexing part 5112. Since specifically carries out multiplex [of the presentation information on all the contents] so that the regeneration time belt may lapabout the image data and voice data which are contained in all the contentsthe multiloop control part 5110 sets a multiplex starting position to "0"and creates and notifies multiplex directions. A multiplex starting position is relative time which sets the transmission start time of a multiplex stream to 0 here.

[0088]Each multiplex directions about image data and voice data are provided with the following.

Multiplex starting position.

PID.

Bit rate.

For exampleabout the image data "Video0.m2v" of the contents 0 of the structure information table 5801. The multiloop control part 5110 refers to the content identifier assignment table 6101 firstRead the value of "VE_comp_tag" 6107 of the image data "0x00"and the value "0x0096" of 6011 is further read from the multiplex information table 6001PID of the image data is calculatedand the value "4Mbps" of 6010 is readit asks for the bit rateand the PID and its bit rate are notified with a multiplex starting position.

[0089]Thenthe multiloop control part 5110 creates the multiplex directions about navigation information as followsand notifies them to the multiplexing part 5112. The multiloop control part 5110 creates [that the earned hours carry out between repetition multiplex / of the navigation information table included in it / for every contentsand] multiplex directions. For examplein the case of the navigation information table 6301 (NVT (00)) shown in drawing 17the multiloop control part 5110 repeats and creates multiplex directions of NVT (00) from the effective start time (5 seconds) shown in the earned-hours table 6306 before effective finish time (65 seconds). Howeverin this embodimentit is made to carry out multiplex rather than effective start time from before fixed time (for example1 second). It carries out multiplex from before fixed time in order to give a margin to processing of the navigation information table in the receiving set 5121.

[0090]The multiplex directions about navigation information are provided with the following.

Multiplex starting position.

The PID.

The transmission capacity (bit rate).

A version number and table_id_ext.

For examplewhen carrying out multiplex [of the navigation information table of the file name "NVT (0 0)" shown in <u>drawing 17</u>]the multiloop control part 5110Make the fixed time front (4 seconds) of effective start time into the first multiplex starting positionand The value "0x0092" of the multiplex information table 6001 to 6009The value "1Mbps" of 6008 is read and it notifies to the multiplexing part 5112 as PID and the bit raterespectively. From the content identifier assignment table 6101the multiloop control part 5110 is the value of 6113 "NE_id" [corresponding to the contents number 0] "0x0000" Readand is notified to the multiplexing part 5112 as table_id_extension.

[0091]The multiloop control part 5110 computes the transmission capacity (bit rate) secured to transmission of the navigation information as a next multiplex starting position by breaking by size of the navigation information table concernedand notifies multiplex directions like the above. Thusasking for a multiplex starting position one by one until effective finish time comesthe multiloop control part 5110 creates multiplex directionsand notifies them to the multiplexing part 5112. Repetition multiplex [of the above NVT (00)] will be carried out by this by after-start 4 seconds - 65 seconds of a multiplex stream.

[0092]NVT by which the multiloop control part 5110 is contained in the contents 0 like the above (01)NVT (02) -- multiplex directions are created like [NVT(s) / of NVT(1 0) NVT (11) etc. which are contained in ... or the contents 1 / other] the aboveand it notifies to the multiplexing part 5112.

1-2-4. System-information table generation part 5105 : (d)
The system-information table generation part 5105 will generate a system-information tableif directions are received from the multiloop control part 5110. The various tables where the variety of information which needs a system-information table in order that the receiving set 5121 may choose the variety of information for identifying the multiplexed stream in a transport streami.e.an eventwas recorded are said.

[0093]First more specifically the system-information table generation part 5105With reference to the multiplex information storage parts store 5104NIT

(Network Information Table)EIT (Event Information Table)SDT (Service Description Table)and PAT (Program Association Table)ETS 300 It generates according to 468 (DVB-SI) standards and 13818 to ISO/IEC 1 (MPEG 2 system) standard.

[0094]NIT records the physical information about a transmission lineetc. here about each transport stream transmitted from a specific network. Drawing 22 (a) is an example of NIT6801 generated by the system-information table generation part 5105. network_id in the network identified by "0x0001." The transport stream from which original_network_id is identified by "0x0001" and transport_stream_id is discriminated by "0x0001" is distributedand it is shown that the specification about the frequency and modulation method is expressed with "transmission clue origin."

[0095]SDT records informationincluding a service name etc.about each service included in a specific transport stream. Drawing 22 (b) is an example of SDT6802 which the system-information table generation part 5105 generates. transport_stream_id in the transport stream identified by "0x0001"The service from which service_id is discriminated by "0x0002" is includedand it is shown that informationincluding the service nameis expressed with "informationincluding a service name etc.."

[0096]EIT records the information about an event namestart timefinish timeetc. about each event contained in specific service. Drawing 22 (c) is an example of EIT6803 which the system-information table generation part 5105 generates. The event from which it is during the service from which service_id is discriminated by "0x0002"and event_id is discriminated by "0x0002" is containedand it is shown that informationincluding the event nameis expressed with "informationincluding an event name etc.."

[0097]PAT records PID of PMT (programmed map table)etc. about each program included in a specific transport stream. Drawing 23 is an example of PAT6901 which the system-information table generation part 5105 generates. In the transport stream from which transport_stream_id is discriminated by "0x0001"the

program of "0x0002" is included for program_noand it expresses that PID of the PMT is "0x0090." In accordance with service_ida program is [program_no] equivalent to an event.

[0098]Nextthe system-information table generation part 5105PMT corresponding to the program which carries out multiplex [of the send data which the send data storage parts store 5102 memorizes] with reference to the multiplex information storage parts store 5104the multiloop control part 5110and the structure information storage part 5109 is generated according to regulation of an MPEG 2 system standard. Drawing 24 is a figure showing an example of PMT created from the entry information 5901 indicated to be the multiplex information table 6001 shown in drawing 14and the content identifier assignment table 6101 shown in drawing 15 to drawing 13.

[0099]In generation of PMT7001program_numberis a value showing the program number of the program (an event) which carries out multiplex [of the send data]and the value of "service_id" 6004 of the multiplex information table 6001 "0x0002" is written in this. "PCR_PID" is a value showing PID of the packet in which the clock information (PCR) used as the standard at the time of decoding this program is includedand the value "0x0091" of "PCR_PID" of the multiplex information table 6001 is written in this.

[0100]"Entry_Descriptor" 7003 are a descriptor including the information on the identifier of the entry contents reproduced at the very beginningwhen this program is chosen. Drawing 25 is a figure showing the details of "Entry_Descriptor" which PMT7001 contains. descriptor_tag of "Entry_Descriptor]7003 is an identifier showing the kind of descriptorand the valuefor example0x98provided in "Entry_Descriptor" is written in. "entry_VE_comp_tag"entry_AE_comp_tagand "entry_NE_id" show the value of the identifier which identifies the image datavoice dataand navigation information which constitute entry contentsrespectively.

[0101]In generation of PMTthe system-information table generation part 5105The contents number "0" of entry contents is acquired with reference to the entry

information 5901The value "0x00" of "VE_comp_tag" 6107 of the contents corresponding to a contents number "0" from the content identifier assignment table 6101AE_comp_tagThe value "0x00" of 6110 and the value "0x0000" of "NE_id" 6113 are taken outand it is written in "entry_VE_comp_tag"entry_AE_comp_tagand "entry_NE_id"respectively.

[0102]moreover -- a table -- 7004 -- this -- a program -- constituting -- a component -- "PID" -- 7005 -- a value -- every -- each -- a component -- transmitting -- having -- data -- a kind -- expressing -- "stream_type" -- 7006 -- being additional -- information -- expressing -- "-- descriptor --] -- 7006 -- correspondence -- being shown -- **** . In the 1st line of Table 7004from the multiplex information table 60016009 values "0x0092"The value "0x05" showing the kind of data transmitted being section data and "NE_Component_Descriptor(0)" 7201 which are shown in drawing 26 (a) are written inrespectively. As for "NE_Component_Descriptor (0)"more than the value of "min_NE_id" means that the navigation information which has NE_id of the value below the value of "max_NE_id" is transmitted in the component to which this was given. In the component identified in this example 6009. Since it carries out multiplex [of the navigation information of the contents of the contents number 0]the value "0x0000" of "NE_id" 6113 corresponding to the contents number 0 is written in "min_NE_id" and "max_NE_id" from the content identifier assignment table 6101. The defined value (here "0x99") which shows the kind of this descriptor is written in "descriptor_tag."

[0103]To the 4th linefrom the 2nd line of Table 7004similarly From the multiplex information table 6001 "to NE_component(1)_pid." Each value of "NE_component(2)_pid" and "NE_component(3)_pid" is readand as "stream_type" as "0x05" and "descripor"Respectively Drawing 26. NE_Component_Descriptor(1) 7202 shown in (b)NE_Component_Descriptor(2) 7203 which are shown in drawing 26 (c)and NE_Component_Descriptor(3) 7204 which are shown in drawing 26 (d) are given.

[0104]In the 5th line of Table 7004from the multiplex information table 60016011

values "0x0096"The value "0x02" showing the kind of data transmitted being image data and "stream_identifier_descriptor(0)" 7301 which are shown in drawing 27 (a) are written inrespectively. "stream_identifier_descirptor (0)" It is shown that the value of the component tag of the component in which this was given 7301 is "0x00." The value of "descriptor_tag" is a defined valuefor example0x52which shows the kind of descriptor.

[0105]To the 6th line of Table 7004from the multiplex information table 6001similarly The value of "VE_component(1)_pid"The value "0x02" of "stream_type" and "stream_identifier_descriptor(1)" 7302 which are shown in drawing 27 (b) are written in. To the 7th line of Table 7004and the 8th linefrom the multiplex information table 6001similarly The value of "AE_component(0)_pid"The value of "AE_component(1)_pid"and the value "0x03" which expresses voice data as "stream_type"stream_identifier_descriptor (0)7301 and "stream_identifier_descriptor(1)" 7302 are written in.

1-2-5. The multiplexing part 5112 multiplexing part 5112Based on the multiplex directions from the multiloop control part 5110the transport stream data which carried out multiplex [of the contents data] into the MPEG2 transport streamand generated it based on the method specified by the MPEG 2 system standard is outputted to the transmission section 5106 one by one.

[0106]Namelyif multiplex directions of image data are received from the multiloop control part 5110the multiplexing part 5112Image data is read from the presentation information storage part 5107and it changes into a data stream and carries out multiplex [of the data stream concerned] into a transport stream from the starting position specified using PID and the bit rate which were specified. If multiplex directions of voice data are received from the multiloop control part 5110will read voice data from the presentation information storage part 5107and it will change into a data streamIt carries out multiplex [of the data stream concerned] into a transport stream from the starting position specified using PID and the bit rate which were specified.

[0107]If multiplex directions of a navigation information table are received from

the multiloop control part 5110Read a navigation information table from the navigation information table generation part 5111and it changes into a data streamIt carries out multiplex [of the data stream concerned] from the starting position where the transport stream was specified using PIDtable_id_extension and version_no which were specifiedand the bit rate.

[0108]About PCRthe multiplexing part 5112 sets the initial value in the head of the transport stream to generate to "0"and carries out multiplex using PCR_PID notified from the multiloop control part 5110. The explanatory view of the multiplexed stream generated by the multiplexing part 5112 is shown in drawing 28. The horizontal axis of the figure expresses time progressand a vertical axis expresses the contents data and PCR by which multiplex is carried out to the time.

[0109]In the figure7401 is the animation data stream to which the video data "Video0.m2v" shared by the contents 0 and the contents 1 was changed into the data stream by the multiplexing part 5112and PID "0x0096" was given further. Multiplex [of this animation stream 7401] is carried out so that the bit rate (4Mbps) which was illustrated continuouslyhowever was divided into the fixed-length packet (called the transport packet of 188-byte length) by the multiplexing part 5112and was actually assigned may be occupied. 7402 is an animation data stream shared by the contents 2 and the contents 3 similarly.

[0110]7403 is the voice data stream to which the voice data "Audio.m2a" common to the contents 0 and the contents 1 was changed into the data stream by the multiplexing part 5112and PID "0x0098" was given further. Multiplex [of this] is carried out so that the assigned bit rate (0.5Mbps) may be occupied. Similarly7404 is a voice data stream common to the contents 2 and the contents 3.

[0111]7405 is the data stream which carried the navigation information table included in the contents 0and multiplex is carried out by the multiplexing part 5112 so that the assigned bit rate (1Mbps) may be occupied. PID "0x0092"table_id_extention "0x0000"and version_no "0x00 to 0x04" are given to

each navigation information table in the data stream 7405. About these navigation information tablesmultiple-times multiplex [of the thing of the same version number] is carried outand the version number is updated with the passage of time. PIDtable_id_extentionand version_no are used in order to identify one navigation information table in the data stream 7405 in the receiving set 5121. Similarly7406-7408 are the data streams which carried the navigation information included in the contents 1-3respectively.

[0112]7409 is time information PCR used as the standard of regeneration timeand multiplex is carried out. Whenever the above-mentioned multiplexing part 5112 receives the multiplex directions from the multiloop control part 5110it performs multi-processingand it memorizes it to the storage parts store which does not generate and illustrate the multiplex stream of an intermediate stateAfter finishing processing all the multiplex directions and making a perfect multiplex streamit is good also as outputting to the transmission section 5106andAfter it memorizes the multiplex directions from the multiloop control part 5110 to the storage parts store which is not illustrated without processing immediately and required multiplex directions gatherit is good also as performing multiplex to time ordergenerating a multiplex streamand outputting to the transmission section 5106 one by one.

1-2-6. If the transmission section 5106 transmission section 5106 has a scheduler for transport stream transmission and it becomes given timefor examplefive quotasrather than the transmission start time of an eventit will start the multiloop control part 5110. If event transmission start time comesto the multiplex stream which the multiplexing part 5112 outputs. NITPATPMT which the system-information table generation part 5105 generatedAccording to regulation of a DVB-SI standard and an MPEG 2 system standardmultiplex [of the system-information tablessuch as SDT and EIT] is repeatedly carried out at the interval defined using PID in which it was providedabnormal conditions etc. are processedand it transmits to receiving set 5121 grade as a transport stream.

[0113]Drawing 29 is an explanatory view showing the transport stream

multiplexed by the transmission section 5106. In addition to the multiplexed stream multiplexed by the multiplexing part 5112the system information of NITPATPMTSDTand EIT has multiplexed. Although multiplex [of two or more events (program)] is done to a transport stream by the transmission section 5106in the figureevents (program) other than the interactive program shown in drawing 5 are omitted.

1-2-7. operation of the digital broadcasting system 5101 -- explain the operation below about the digital broadcasting system 5101 in the embodiment of this invention constituted as mentioned above.

[0114]It is a flow chart which shows drawing 30 and the whole contents of processing of the digital broadcasting system 5101. The multiloop control part 5110 first performs creation (S7602) of (a) content identifier assignment table mentioned abovecreation (S7604) of (b) version number assignment tablegeneration instruction (S7606) of (c) navigation information tableand generation instruction (S7608) of (d) system-information table. After a system-information table is generated by the system-information table generation part 5105the multiloop control part 5110 reads the value of "PCR_PID" from the multiplex information storage parts store 5104and notifies it to the multiplexing part 5112 (S7610).

[0115]Nextthe multiloop control part 5110 points to multiplexing of presentation information to the multiplexing part 5112 (S7611)and directs multiplex [of navigation information] to the multiplexing part 5112 further (S77- 0S77- 1... S77- n). at this timethe multiloop control part 5110 generates n+1 taskfor example about n+1 contents from the contents 0 to the contents n -- a multitask operation -- above S77-0S77-1and ... S77-n is processed in parallel.

[0116]Drawing 31 shows the more detailed flow chart of multiplex directions creation of the above-mentioned presentation information. In the figurei is a variable for counting a contents number one by one. The multiloop control part 5110 initializes and sets the variable i to 0 (S7612). With reference to the structure information storage part 5109as for the multiloop control part 5110a

contents number judges whether multiplex [of the image data of the contents of i] has already been carried out (S7614S7616).

[0117]This judgment is made by confirming whether the same image data as the contents of the contents number i is contained in the contents of a contents number smaller than i. For examplewhen judging using the structure information table 5801 shown in drawing 12and the contents counter i is "0"are judged with multiplex [of the image data "Video0.m2v"] not having been carried out yetbut. Since the contents of the contents number 0 contain the same image data "Video0.m2v" when the contents counter i is "1"it is judged with multiplex already having been carried out.

[0118]When multiplex has already been carried outmulti-processing of image data is not performed. When multiplex is not carried outit directs multiplex [of the image data of the contents of the contents number i] to the multiplexing part 5112 (S7618). Under the present circumstancesthe multiloop control part 5110 combines a value with the bit rate with the multiplexing part 5112and notifies that they are a multiplex starting position and PID. The value "0" (head of a transport stream) is notified as a multiplex starting position.

[0119]In that casethe multiloop control part 5110 reads and notifies the value of PID of the component corresponding to the component tag assigned to the image data which is going to carry out multiplex with reference to the multiplex information storage parts store 5104 as a value of PID. As the bit ratethe bit rate of the component corresponding to the component tag assigned to the image data which is going to carry out multiplex is read and notified with reference to the multiplex information storage parts store 5104.

[0120]For examplewhen carrying out multiplex [of the image data "Video0.m2v" of the contents of the contents number 0 of the structure information table 5801]the multiloop control part 5110With reference to the content identifier assignment table 6101the value of "VE_comp_tag" 6107 of the image data of the contents number 0 "0x00" is read first. And from the multiplex information table 6001the value "0x0096" of 6011 and the value "4Mbps" of 6010 are readand it

notifies to the multiplexing part 5112.

[0121]Nextthe multiloop control part 5110 directs multiplex [of voice data] to the multiplexing part 5112when a contents number judges whether multiplex [of the voice data of the contents of i] has already been carried out (S7620) and multiplex is not carried out like the case of image data. When multiplex has already been carried outmulti-processing of voice data is not performed. The above processing is performed about all the contents. As a resultthe multiplex directions which set the multiplex starting position to "0" are created about all the image data and whole tone voice data.

[0122]Drawing 32 shows the more detailed flow chart of multiplex directions creation processing (S77- 0S77- 1... S77- n) of the navigation information shown in drawing 30. The figure shows multiplex directions of the navigation information about the contents i among the contents 0 - the contents n. About other contentsit performs in parallel with this. The variable wp expresses with time (second) the multiplex starting position of C navigation information table which set the start time of a transport stream to 0. The variable endT expresses the repetition multiplex finish time of a navigation information table with one version number.

[0123]The multiloop control part 5110 initializes the value of version number v and the multiplex starting position wp to "0" (S7702). And it is investigated whether with reference to the storage area of the navigation information table generation part 5111the navigation information table of the contents number i and version number v which have the file name "NVT (iv)" exists (S7704). Processing is ended when "NVT (iv)" does not exist. When "NVT (iv)" furthermore existsit is investigated whether the file name "NVT (iv+1)" exists similarly (S7708).

[0124]When "NVT (iv+1)" does not existthe multiloop control part 5110 reads and sets the value of effective finish time "end_time" as the variable endT from the navigation information table of a file name "NVT (iv)" (S7710). When "NVT (iv+1)" existsThe multiloop control part 5110 The value of the effective finish time

"end_time" of the navigation information table of a file name "NVT (iv)"The value which subtracted 1 from the value of the effective start time "start_time" of the navigation information table of a file name "NVT (iv+1)" is comparedand the value of the smaller one is set as the variable endT (S7714). For examplewhen it is i= 0 and v= 0NVT (0, 0)shown in <u>drawing 17</u> and "NVT (01)" shown in <u>drawing 19</u> are memorizedand the multiloop control part 5110The value "69" subtracted from the value "65" of "end_time" in "NVT (00)" and the value "70" of "start_time" in "NVT (01)" for 1 second is comparedand the value "65" of the smaller one is set as the variable endT. The time when multiplex [of "the NVT (00)"] should be carried out repeatedly by this will be from wp=0 before endT=65.

[0125]Nextby formula wp=wp+ {S_NVT(iv)/Bi}the multiloop control part 5110 asks for the multiplex end position wp at the time of carrying out "NVT (iv)" multiplexand compares this with the value of the variable endT (S7712). HereS_NVT (iv) is the size at the time of changing "NVT (iv)" into a transport stream packet based on an MPEG 2 system standard. Bi is the bit rate assigned to the component which carries out multiplex [of "the NVT (iv)"]and the value of the bit rate assigned to the component concerned is read from the multiplex information storage parts store 5104.

[0126]When the multiplex end position wp is larger than the variable endTthe multiloop control part 5110 adds "1" to version number v (S7716)and returns to processing of S7704. When multiplex end position is below endTthe multiloop control part 5110 creates multiplex directions of "NVT (iv)"and notifies them to the multiplexing part 5112. Under the present circumstancesthe multiloop control part 5110 notifies the value of the multiplex starting position wpthe value of the bit rate Bithe value of PIDthe value of table_idthe value of table_id_extensionand the value of version_no as multiplex directions.

[0127]In that casethe multiloop control part 5110 reads about PID the value of PID assigned to the component which carries out multiplex [of the navigation information table of the contents number i] from the multiplex information storage parts store 5104. About table_idit is considered as the value (for example0x90)

provided in navigation information tables.

[0128]About table_id_extensionthe value assigned to "NE_id" of the contents of the contents number i in the content identifier assignment table is read. About version_noit reads from the version number assignment table 6201 shown in drawing 16. For examplein "NVT (00)" shown in drawing 17the very first multiplex directionsIt is set to wp=0PID=0x0092 (= "NE_component(0)_pid")Bi=1Mbpstable_id=0x90table_id_extension=0x0000 (= "NE_id")and version_no=0x00.

[0129]After notifying multiplex directionsthe multiloop control part 5110The value of a multiplex starting position is updated by formula wp=wp+ {S_NVT(iv)/Bi} (S7720)and the processing after the judgment of the multiplex end position at the time of carrying out multiplex [of the navigation information table of the file name NVT (iv)] again (S7712) is repeated. In response to the multiplex directions notified by the above processingthe multiplexing part 5112 generates a multiplex stream. Furthermorethe transmission section 5106 does multiplex [of this multiplex stream] to a transport streamand transmits.

1-3. In the outline lineblock diagram 4 of the receiving set 5121 the receiving set 5121The receive section 5122 and the TS (Transport Stream) decoder section 5123The AV decoder part 5124the receiving data storage part 5125and the reception control part 5126It has the signal receive section 5127the regenerating section 5128the indicator 5129and the voice output part 5130and it is constituted so that contents may be taken out interactively and it may reproduce according to user's operation out of the transport stream transmitted from the digital broadcasting system 5101.The receiving data storage part 5125 is provided with the following.

Navigation information table storage part 5132.

System-information table storage part 5133.

1-3-1. The receive section 5122 receive section 5122 receives the transport stream specified by the reception control part 5126and outputs to the TS decoder

part 5123.

1-3-2. The TS decoder part 5123 TS-decoder part 5123It has the filter condition storage parts store 5131 which memorizes the filter condition set up by the reception control part 5126Out of the transport stream outputted from the receive section 5122 according to this filter conditionimage data and voice data are separatedit outputs to the AV decoder part 5124a navigation information table is separatedand it writes in the receiving data storage part 5125. System informationsuch as PCR (reference clock information)is separatedand it outputs to the AV decoder part 5124.

[0130]The filter condition storage parts store 5131 memorizes two or more filter conditions. Corresponding to two or more filter conditionsthe TS decoder part 5123 performs two or more separation in parallel. Drawing 33 (a) and (b) shows an example of the filter condition memorized by the filter condition storage parts store 5131respectively. In these figureseach line of the filter condition table 7801-7807 shows one filter condition specified in a filter identification numberPIDtable_id_extensionversion_noand an output destination change.

[0131]The "filter identification number" column 7802 is a number which identifies each filter condition. The figure shows that it is a filter condition from which "0" separates image data1separates voice dataand "2" separates navigation informationrespectivelyand shows the conditions which separate system informationsuch as PMTafter "3" which is not illustrated. The "PID" column 7803 expresses the value of PID of the data which should be separated.

[0132]The "table_id_extension" column 7804 shows the value of table_id_extension of the identifier for separating navigation information and system information. The "version_no" column 7805 shows the value of the version number used for separation of navigation information. When "-" is written in the "version_no" column 7805conditions are set up and a thing [****]i.e.dissociatewhatever the value of the identifier "version_no" may be is shown.

[0133]The output destination change which outputs the separated data to the

"output destination change" column 7806 is shown. For examplethe image data separated by the filter condition of the filter identification number "0" shown in drawing 33 (a)The AV decoder part 5124 is specified as the "output destination change" column 7806and the "table_id_extension" column 7804 and the "version_no" column 7805 cannot be set up. That issince "table_id_extension" and "version_no" are not given to image datait is not made to a filter condition. The value "0x0096" of PID of the image data which should be separated is set to the "PID" column 7803. When the receive section 5122 has received by this the transport stream shown in drawing 29the TS decoder part 5123 separates the image data "Video0.m2v"and outputs it to the AV decoder part 5124.

[0134]The voice data separated by the filter condition of the filter identification number "1" shown in drawing 33 (a)The AV decoder part 5124 is specified as the "output destination change" column 7806and the "table_id_extension" column 7804 and the "version_no" column 7805 cannot be set up. That isit is not made to a filter condition like image data. The value "0x0098" of PID of the voice data which should be separated by the reception control part 5126 is set to the "PID" column 7803. When the receive section 5122 has received the transport stream shown in drawing 29the TS decoder part 5123 separates voice data "Audio0.m2a"and outputs it to the AV decoder part 5124.

[0135]Similarlyas for the navigation information table separated by the filter condition of a filter identification number "2"the navigation information table storage part 5132 is set as the "output destination change" column 7806. At this timethe TS decoder part 5123 writes the separated navigation information table in the navigation information table storage part 5132. In the "PID" column 7803 and the "table_id_extension" column 7804. The value "0x0092" of PID of the navigation information table which should be separated by the reception control part 5126respectivelyand the value "0x0000" of table_id_extension are set up. Conditions are not set to the "version_no" column 7805. When the receive section 5122 has received by this the transport stream shown in drawing 29the TS decoder part 5123According to timea navigation information table "NVT

(00)"NVT (0, 1)Separate "NVT (02) or"NVT (0, 3) orand "NVT (04)"and it writes in the navigation information table storage part 5132and that is notified to the reception control part 5126.

[0136]The filter condition table 7801 of <u>drawing 33 </u>(a) shows the filter condition memorized by the filter condition storage parts store 5131 immediately after the event selection by a userand shows the filter condition of entry contents. The same may be said of the filter condition table 7807. Howeversince the value "0x01" is set as "version_no] of the filter condition of navigation informationin the filter condition table 7807 the TS decoder part 5123When the receive section 5122 has received the transport stream shown in <u>drawing 29</u>separate the navigation information table "NVT (01)"and it writes in the navigation information table storage part 5132and that is notified to the reception control part 5126. that isthis filter condition table 7807 shows the filter condition after separation of entry contents -- it is.

1-3-3. The AV decoder part 5124 AV-decoder part 5124 has a clock part which is not illustratedit decodes the image data and voice data which were outputted from the TS decoder part 5123 according to an MPEG 2 standardtaking a synchronizationand outputs them to the regenerating section 5128. A clock part is set as right reference time with the value of PCR (reference clock information) outputted from the TS decoder part 5123and counts the time used as the standard for decoding image data and voice datataking the right synchronization.

1-3-4. The receiving data storage part 5125 receiving data storage part 5125 is provided with the following.

For exampleit comprises RAM etc. and is the navigation information table storage part 5132.

System-information table storage part 5133.

The navigation information table storage part 5132 memorizes the navigation information table separated from the transport stream by the TS decoder part 5123. The system-information table storage part 5133 memorizes system-information tables separated from the transport stream by the TS decoder part

5123such as NITSDTEITPATand PMT. About the contents of these navigation information tablesand the contents of the system-information tablesince it is the same as that of what was shown in drawing 17 - drawing 27the explanation is omitted.

1-3-5. The signal receive section 5127 signal receive section 5127 receives the manipulate signal of a user's operating memberand outputs to the reception control part 5126. For examplewhen the selection signal of the event showing the interactive program in the transport stream transmitted from the digital broadcasting system 5101 is receivedthe selection signal is outputted to the reception control part 5126. When the definite signal by a user's operation mentioned later is receivedthis signal is outputted to the reception control part 5126. If an operating member is a navigational panela remote controletc. with which the receiving set 5121 was equippedfor examplethere is a key of the "right"the "left"and "decision" and each button is pushed by the usera remote control will transmit this signal to the signal receive section 5127. It is operated in order that this "right" and a "left" key may change the selective state of the button in the display image currently displayed on the indicator 5129 to the button image of one rightor the button image of one leftand a "definite" key is operated in order to become final and conclusive that selective state.

1-3-6. The regenerating section 5128 regenerating section 5128The image data decoded in the AV decoder part 5124 according to the directions from the reception control part 5126It outputs to the indicator 5129 by making into a video signal the graphics information outputted from the reception control part 5126and the voice data decoded in the AV decoder part 5124 is outputted to the voice output part 5130. Under the present circumstancesgraphics information is a display position on the display screen notified from the reception control part 5126and is piled up on a video data.

1-3-7. TV monitor etc. realize and the indicator 5129 indicator 5129 displays the picture outputted from the regenerating section 5128.

1-3-8. It realizes by a loudspeaker etc. and the voice output part 5130 voice

output part 5130 outputs the sound outputted from the regenerating section 5128.

1-3-9. the reception control part 5126 reception control part 5126 comprises a CPUa ROM which stored the programRAM of operatingetc. -- whole control of the receiving set 5121 -- in additioncontrol reception of an interactive program.

1-3-9-1. Reception control part 5126 : the schematic diagram 36 of the reception of an interactive program is a flow chart which shows the outline of the reception of the interactive program by the reception control part 5126.

[0137]The reception control part 5126 controls the receive section 5122 and the TS decoder part 5123 according to the procedure provided in the power up of the receiving set 5121 by the MPEG 2 system standard and the DVB-SI standardVarious kinds of system-information tables included in a transport stream are made to write in the system-information table storage part 5133. The display of a race card etc. is attained at this time.

[0138]When a user chooses the event corresponding to the interactive program in a transport stream via a remote control etc.the reception control part 5126Receive the selection signal concerned via the signal receive section 5127and the system-information table in the system-information table storage part 5133 is referred toThe value of the identifier of the eventoriginal_network_idtransport_stream_idservice_idand event_id is obtained (S8102).

[0139]With reference to the system-information table in the system-information table storage part 5133the reception control part 5126 points to reception of the transport stream which the transmission section 5106 transmits to the receive section 5122and directs separation of PMT corresponding to the selected event in the TS decoder part 5123. The receive section 5122 receives the transport stream which the transmission section 5106 transmitsand outputs to the TS decoder part 5123. The TS decoder part 5123 separates PMT corresponding to the selected eventwrites it in the system-information table storage part 5133 in the receiving data storage part 5125and is notified to the reception control part 5126. From the TS decoder part 5123if the notice of PMT reception is

receivedwith reference to PMT in the system-information table storage part 5133the reception control part 5126 will acquire PID of PCRand will write it in the filter condition storage parts store 5131 (S8104).

[0140]Each variable cur_ which shows the reception control part 5126 below ... the service/event chosen as _id -- each ... _id is set up and the value of variable cur_VE_comp_tagvariable cur_AE_comp_tagand variable cur_NE_id is cleared. These variables show the information on the identifier of the contents reproduced now (S8106).

(Variable cur_ ... _id) <- (selected event ... value of _id)

Variable cur_original_network_id. <-. Value variable cur_AE_service_id of value variable cur_VE_service_id <- service_id of value variable cur_transport_stream_id <- transport_stream_id of original_network_id. <-. Value variable cur_NE_event_id of value variable cur_AE_event_id <- event_id of value variable cur_VE_event_id <- event_id of value variable cur_NE_service_id <- service_id of service_id. <- value variable cur_VE_comp_tag <- 0 of event_id (clearance)

Variable cur_AE_comp_tag <- 0 (clear)

Variable cur_NE_id <- 0 (clear)

Nexteach variable new_ which shows the reception control part 5126 below ... the event chosen as _id -- each ... the value of _id is set up (S8108). In that casethe value of entry_VE_comp_tagentry_AE_comp_tagand entry_NE_id is read from PMT memorized by the system-information table storage part 5133.

(Variable new_ ... _id) <- (selected event ... value of _id)

Variable new_original_network_id. <-. Value variable new_AE_service_id of value variable new_VE_service_id <- service_id of value variable new_transport_stream_id <- transport_stream_id of original_network_id. <-. Value variable new_NE_event_id of value variable new_AE_event_id <- event_id of value variable new_VE_event_id <- event_id of value variable new_NE_service_id <- service_id of service_id. To the value variable new_VE_comp_tag <- entry_VE_comp_tag variable new_AE_comp_tag <-

entry_AE_comp_tag variable new_NE_id <- entry_NE_id order of <- event_id. Zero clearance (S8112) of the content change flag which shows that the reception control part 5126 is in the spawn process (S8110) of contentsand the state which needs a contents changeand reproduction control processing (S8114) of navigation informationAn interactive program is controlled by repeating.

1-3-9-2. Reception control part 5126 : contents change processing <u>drawing 37</u> is a flow chart which shows the contents change processing (S8110) shown in <u>drawing 36</u> more to details.

[0141]Firstthe reception control part 5126 has the same value of new_original_network_id and cur_original_network_id which are the variable which self has memorizedAnd it is judged whether the value of variable new_transport_stream_id and cur_transport_stream_id is the same (S8202). When the samedeed processing is ended for the changing process (S8210) of image datachange processing (S8212) of voice dataand change processing (S8214) of navigation information in parallel. The details of change processing of image datachange processing of voice dataand change processing of navigation information are mentioned later.

[0142]When not the samea system-information table is referred to according to the procedure defined by the MPEG 2 system standard and the DVB-SI standardIt points to reception of the transport stream identified by variable new_original_network_id and variable new_transport_stream_id to the receive section 5122 (S8204)The value of variable new_original_network_id is set as variable cur_original_network_idThe value of variable new_transport_stream_id is set as variable cur_transport_stream_id (S8206)Variable cur_VE_service_idvariable cur_VE_event_idVariable cur_VE_comp_tagvariable cur_AE_service_idvariable cur_AE_event_idClear the value of variable cur_AE_comp_tagvariable cur_NE_service_idvariable cur_NE_event_idand variable cur_NE_id (S8208)and The changing process (S8210) of image dataand change processing (S8212) of voice dataDeed processing is ended for change

processing (S8214) of navigation information in parallel.

1-3-9-3. Reception control part 5126 : image data change processing drawing 38 is a flow chart which shows change processing (S8210) of the image data shown in drawing 37 more to details.

[0143]The reception control part 5126 has the same value of variable new_VE_service_id and cur_VE_service_id which self has memorizedAnd it is judged whether the value of variable new_VE_event_id and cur_VE_event_id is the same (S8302). It judges whether at the time of affirmationthe value of variable new_VE_comp_tag and cur_VE_comp_tag is the same (S8304)processing is ended at the time of affirmationand it moves to S8310 of drawing 38 at the time of denial. When the judgment of S8302 is denialthe filter condition of PMT of the event corresponding to variable new_VE_service_id and new_VE_event_id is set as the filter condition storage parts store 5131. The TS decoder part 5123 separates desired PMTmemorizes it to the system-information table storage part 5133and is notified to the reception control part 5126. If the notice of PMT separation is receivedthe reception control part 5126 will acquire PID of PCR with reference to PMT which receivedand will set it as the filter condition storage parts store 5131 (S8306).

[0144]The reception control part 5126 sets the value of variable new_VE_service_id as variable cur_VE_idand sets the value of variable new_VE_event_id as variable cur_VE_event_id (S8308). In S8310the reception control part 5126PMT memorized by the system-information table storage part 5133 corresponding to the event identified by variable cur_VE_service_id and cur_VE_event_id is referred toIt has a component tag equal to the value of variable new_VE_comp_tagand the data to transmit acquires PID of the component which is image data. This is set as the filter condition of the image data of the filter condition storage parts store 5131. The TS decoder part 5123 separates the image data corresponding to the value of variable new_VE_comp_tag out of a transport stream according to a filter conditionand outputs it to the AV decoder part 5124. The AV decoder part 5124 decodes this

image dataand is made to display it on the indicator 5129 via the regenerating section 5128 (S8312). The reception control part 5126 sets the value of variable new_VE_comp_tag as variable cur_VE_comp_tag (S8314)and ends processing.

1-3-9-4. Reception control part 5126 : voice data change processing drawing 39 is a flow chart which shows change processing (S8212) of the voice data shown in drawing 37 more to details.

[0145]The reception control part 5126 has the same value of variable new_AE_service_id and cur_AE_service_id which self has memorizedAnd it is judged whether the value of variable new_AE_event_id and cur_AE_event_id is the same (S8402). It judges whether at the time of affirmationthe value of variable new_AE_comp_tag and cur_AE_comp_tag is the same (S8404)processing is ended at the time of affirmationand it moves to S8410 at the time of denial. When the judgment of S8402 is denialthe filter condition of PMT of the event corresponding to variable new_AE_service_id and new_AE_event_id is set as the filter condition storage parts store 5131. The TS decoder part 5123 separates desired PMTand the system-information table storage part 5133 is made to memorize itand it is notified to the reception control part 5126 (S8406). The reception control part 5126 sets the value of variable new_AE_service_id as variable cur_AE_idand sets the value of variable new_AE_event_id as variable cur_AE_event_id (S8408). The reception control part 5126 Variable cur_AE_service_idPMT memorized by the system-information table storage part 5133 corresponding to the event identified by cur_AE_event_id is referred toThe data which has and transmits a component tag equal to the value of variable new_AE_comp_tag acquires PID of the component which is voice data (S8410)and this is further set as the filter condition of the voice data of the filter condition storage parts store 5131. The TS decoder part 5123 separates the voice data corresponding to the value of variable new_AE_comp_tag out of a transport stream according to a filter conditionand outputs it to the AV decoder part 5124. The AV decoder part 5124 decodes this voice dataand outputs it to the voice output part 5130 via the regenerating section 5128 (S8412). The

reception control part 5126 sets the value of variable new_AE_comp_tag as variable cur_AE_comp_tag (S8414)and ends processing.

1-3-9-5. Reception control part 5126 : navigation information change processing drawing 40 is a flow chart which shows the navigation information change processing (S8214) shown in drawing 37 more to details.

[0146]The reception control part 5126 has the same value of variable new_NE_service_id and cur_NE_service_id which self has memorizedAnd it is judged whether the value of variable new_NE_event_id and cur_NE_event_id is the same (S8502). It judges whether at the time of affirmationthe value of variable new_NE_id and cur_NE_id is the same (S8504)processing is ended at the time of affirmationand it moves to S8510 at the time of denial. When the judgment of S8502 is denialthe filter condition of PMT of the event corresponding to variable new_NE_service_id and new_NE_event_id is set as the filter condition storage parts store 5131. The TS decoder part 5123 separates desired PMTmemorizes it to the system-information table storage part 5133and is notified to the reception control part 5126 (S8506). The reception control part 5126 sets the value of variable new_NE_service_id as variable cur_NE_service_idand sets the value of variable new_NE_event_id as variable cur_NE_event_id (S8508). The reception control part 5126 Variable cur_NE_service_idWith reference to PMT memorized by the system-information table storage part 5133 corresponding to the event identified by cur_NE_event_idPID of a component which transmits the navigation information of variable new_NE_id is acquired (S8510). Nextthe reception control part 5126 sets the value of PID acquired by S8510 as "PID" as the filter condition of the navigation information of the filter condition storage parts store 5131and sets the value of variable new_NE_id as it as "table_id_extension." "version_no" is set up without conditions. The TS decoder part 5123 separates the navigation information table corresponding to the value of variable new_NE_id out of a transport stream according to a filter conditionand the navigation information table storage part 5132 is made to memorize itand it is notified to the reception

control part 5126. That iswhen acquiring a navigation information table firstthe navigation information table transmitted to the time is separated and acquired only with the value of PID and table_id_extension irrespective of the version information given to the navigation information table (S8512). The reception control part 5126 sets the value of variable new_NE_id as variable cur_NE_id (S8514)and ends processing.

1-3-9-6. Reception control part 5126 : the dialog control diagram 41 by navigation information is a flow chart which shows the dialog control management by navigation information.

[0147]The reception control part 5126 judges waiting (S8602) and the existence of a notice for the notice of a purport which separated the navigation information table from the TS decoder part 5123. When there is a noticeit progresses to S8606and when there is nothingit returns to S8602 (S8604). The reception control part 5126 reads the version number of the navigation information table memorized by the navigation information table storage part 51321is added to this and it is set as "version_no" of the filter condition of the navigation information table of the filter condition storage parts store 5131 (S8606). Nextthe reception control part 5126 initializes variable cur_focus to zero (S8608). And the navigation information table memorized by the navigation information table storage part 5132 is readand the bit map data and display coordinates which are displayed on a screen are read with reference to an object definition table and a bit map table. At this timethe bit map data corresponding to the bit map index value shown in the "Focused Bitmap" column about a button object with an object index value equal to cur_focusAbout the button object of the other object index valuethe bit map data corresponding to the bit map index value shown in the "Normal Bitmap" column is read (S8610). Nextthe value of "start_time] of an earned-hours table is set as variable start_timeand the value of "end_time" of an earned-hours table is set as variable end_timerespectively (S8612).

[0148]The reception control part 5126 sets current time as variable cur_time with reference to the clock part of the AV decoder part 5124 (S8614). And the

information on waiting (S8616)and the bit map data and the coordinate value which were read by S8610 is outputted to the regenerating section 5128 until the value of variable start_time becomes more than the value of variable cur_time. The regenerating section 5128 is put on the coordinates position which had bit map data which the reception control part 5126 outputs on the image data which the AV decoder part 5124 decoded specified and is displayed on the indicator 5129 (S8618).

[0149]Nextthe reception control part 5126 judges whether the value of variable cur_time is more than the value of variable end_time (S8622)if it is affirmationwill point to elimination of bit map data on display to the regenerating section 5128 (S8624)and will return to S8602. If it is denial in S8622user input processing will be performed. The details of user input processing are mentioned later (S8626).

[0150]The reception control part 5126 judges whether the variable ContentsChangeflag is 1 (S8628)andin affirmationends reproduction control processing of navigation information. It is judged whether in denialthere was any notice of new navigation information table acquisition from the TS decoder part 5123 (S8630). When there is a noticeit points to elimination of bit map data on display to the regenerating section 5128 (S8632)and returns to S8606. When judged with there having been no notice by S8630it returns to S8622.

1-3-9-7. Reception control part 5126 : user I/F processing drawing 42 by navigation information is a flow chart which shows the user I/F (InterFace) processing by navigation information.

[0151]The reception control part 5126 judges whether the user entry received from the signal receive section 5127 is a "right" key (S8702). When it is not a "right" keyit moves to S8708and at the time of a "right" keythe value of variable cur_focus is increased one. When the value of variable cur_focus is equal to the maximum of the object index value in the navigation information table in the navigation information table storage part 5132it leaves as it is (S8704)and it moves to S8706. The reception control part 5126 reads the bit map data displayed on a screenand the coordinate value of a display position with

reference to the object definition table and bit map table in the navigation information table memorized by the navigation information table storage part 5132and outputs them to the regenerating section 5128. At this timethe bit map data corresponding to the bit map index value shown in the "Focused Bitmap" column about a button object with an object index value equal to cur_focusAbout the button object of the other object index valuethe bit map data corresponding to the bit map index value shown in the "Normal Bitmap" column is read. The regenerating section 5128 is put on the position which had this bit map data specified on the image data which the AV decoder part 5124 decodedis displayed on the indicator 5129and ends a user input process (S8706).

[0152]Nextin S8708it judges whether the user entry received from the signal receive section 5127 is a "left" key (S8708)when it is not a "left" keyit moves to S8712and the reception control part 5126 reduces the value of variable cur_focus one at the time of a "left" key. When the value of variable cur_focus is "0"it leaves as it is (S8710)and it moves to S8706.

[0153]Nextit judges whether the user entry received from the signal receive section 5127 is "decision" (S8708)and moves to S8714 at the time of "decision"and the reception control part 5126 ends a user input processwhen that is not right. In S8714the reception control part 5126 refers to the object definition table in the navigation information table memorized by the navigation information table storage part 5132An object index value acquires the hair drier index value of a button object equal to the value of variable cur_focusand a script is read from the hair drier corresponding to a hair drier index value with reference to a hair drier definition table. It judges whether a script is "goto_contents" (S8716)and moves to S8724 at the time of denialand the hyperlink index value of an argument is read at the time of affirmation (S8718).

[0154]The reception control part 5126 refers to the hyperlink table of a navigation information tableoriginal_network_id of the identifier of the contents corresponding to the hyperlink index value read by S8718transport_stream_idVE_service_idVE_event_idVE_comp_tagAE_service_id

AE_event_idAE_comp_tagNE_service_idThe value of NE_event_id and NE_id Variable

new_original_network_idnew_transport_stream_idnew_VE_service_idnew_VE_event_idnew_VE_compLtagIt is set as

new_AE_service_idnew_AE_event_idnew_AE_comp_tagnew_NE_service_idnew_NE_event_idand new_NE_idrespectively. Howeverthe value is not set up all over the hyperlink tablei.e.the value of the basis of each variable is not changed about the identifier of "-" (S8720). The reception control part 5126 sets the value of the variable ContentsChangeflag as "1" (S8722)and ends a user input process. [0155]In S8724the reception control part 5126 judges whether a script is "goto_entry" (S8724)and ends user I/F processing at the time of denial. At the time of affirmationPMT memorized by the system-information table storage part 5133 corresponding to the event identified by variable cur_NE_service_id and cur_NE_event_id is referred toentry_VE_comp_tagentry_AE_comp_tagThe value of "entry_NE_id" Variable new_VE_compLtagIt is set as variable new_AE_comp_tag and variable new_NE_idrespectivelyThe value of variable cur_NE_service_id is set as variable new_VE_service_id and variable new_AE_service_idThe value of variable new_NE_event_id is set as variable new_AE_event_id and variable new_AE_event_id (S8726)and it moves to S8722. 1-3-10. operation of the receiving set 5121 -- about the receiving set 5121 of this invention constituted as mentioned above. Belowthe operation is divided into the selection receiving operation of ** interactive programthe display action by ** navigation informationthe user I/F processing by ** navigation informationand ** contents change processingand is explained.

Various kinds of system-information tables included in a transport stream are received by the power up of the selection receiving operation receiving set 5121 of a 1-3-10-1.** interactive programand it is written in it at the system-information table storage part 5133.

[0156]When the event by which multiplex was carried out to the transport stream shown in the interactive programi.e.<u>drawing 29</u>by the user is chosenthe reception

control part 5126NIT (refer to drawing 22) memorized by the system-information table storage part 5133 to original_network_id by "0x0001." transport_stream_id acquires the information on transmission clue originsuch as frequency etc. of the transport stream identified by "0x0001"and directs reception of a transport stream to the receive section 5122.

[0157]Furthermoreas for the reception control part 5126program_noof an interactive program acquires PID "0x0090" of PMT of the program of "0x0002" equal to the value of service_id from PAT (refer to drawing 23)This is set as the filter condition of PMT in the filter condition storage parts store 5131. As a resultPMT7001 shown in drawing 24 by the TS decoder part 5123 is separatedand it is written in the system-information table storage part 5133.

[0158]From PMT7001 memorized by the system-information table storage part 5133the reception control part 5126 reads PID "0x0091" of PCRand sets it as the filter condition of PCR in the filter condition storage parts store 5131. The reception control part 5126 reads the identifier of the image data of entry contentsvoice dataand each navigation informationand sets it as the filter condition in the filter condition storage parts store 5131.

[0159]When it explains in more detailthe reception control part 5126Entry_Descriptor7003 shown in drawing 25 in PMT7001 is referred toThe value "0x00" of "entry_VE_comp_tag" is readstream_identifier_descriptor of "0x00" is given for the value of "component_tag"And the kind of data transmitted reads the value "0x0096" of PID of the component which is image dataand it is set as "PID" of the filter condition of the image data in the filter condition storage parts store 5131.

[0160]Similarly the reception control part 5126 reads the value "0x00" of "entry_AE_comp_tag"stream_identifier_descriptor of "0x00" is given for the value of "component_tag"And the kind of data transmitted reads the value "0x0098" of PID of the component which is voice dataand it is set as "PID" of the filter condition of the voice data in the filter condition storage parts store 5131.

[0161]Similarlythe reception control part 5126 reads the value "0x0000" of

"entry_NE_id"and sets it as the filter condition "table_id_extension" of the navigation information table in the filter condition storage parts store 5131. The reception control part 5126 refers to Table 7004 of PMT7001The value "0x0092" of PID of the component in which "NE_Component_Descriptor(0)" 7201 in which "0x0000" is contained were given between the value of "min_NE_id" and the value of "max_NE_id" is readIt is set as the filter condition "PID" of a navigation information table. The filter condition "version_no" is set up without conditions. At this timethe filter condition table which the filter condition storage parts store 5131 holds becomes as it is shown in the filter condition table 7801 shown in <u>drawing 33</u> (a).

[0162]thereby -- a transport stream -- inside -- image data -- "-- Video -- zero . -- m -- two -- v -- " -- voice data -- "-- Audio -- zero . -- m -- two -- a --] -- a TS decoder -- a part -- 5123 -- dissociating -- having -- an AV decoder -- a part -- 5124 -- outputting -- having . Since the filter condition "version_no" has no conditionsaccording to timeA navigation information table "NVT (0.0)"NVT (0, 1) orNVT (0, 2) orNVT (0, 3) orand "NVT (04)" is separatedand it is written in the navigation information table storage part 5132.

[0163]The reception control part 5126 reads the navigation information table separated from the navigation information table storage part 5132The value which added "1" to the version number currently assigned to the separated navigation information table is written in the filter condition "version_no" of the navigation information table in the filter condition storage parts store 5131. Howeverif "1" is added to the value of a version numberin exceeding the maximum 31it returns to "0."

[0164]For examplewhen the TS decoder part 5123 separates the navigation information table 6301 of the file name "NVT (00)" shown in <u>drawing 17</u> based on the filter condition table 7801 shown in <u>drawing 33</u> (a)The reception control part 5126 will read the navigation information table 6301 from the navigation information table storage part 5132if the notice of a purport which separated the navigation information table is received. Furthermore1is added to the value "0" of

a version numberand "0x01" is set as "version_no" of the filter condition of the navigation information in the filter condition storage parts store 5131. At this timethe filter condition table in the filter condition storage parts store 5131 becomes as it is shown in the filter condition table 7807 shown in drawing 33 (b).

[0165]By thissince the TS decoder part 5123 separates only the navigation information which has the next version number of the navigation information table under present reproductionIt becomes unnecessary to check whether whenever the reception control part 5126 received new navigation informationthe contents have changedand load is reduced.

the display action by 1-3-10-2.** navigation information -- according to the navigation information table separated as mentioned abovethe reception control part 5126 controls as follows the display of the object (a button and a picture) contained in it. Herethe navigation information "NVT (00)" shown in drawing 17 should be separated.

[0166]Based on the separated navigation informationthe reception control part 5126The object definition table 6302 of NVT (00) which initializes variable cur_focus to "0" and was shown in drawing 17X coordinate value "20" and the Y coordinate value "400" which were shown in the object index value "0" column with reference to the bit map table 6305The bit map data corresponding to the bit map index value "1" shown in the "Focused Bitmap" column is readThe bit map data corresponding to X coordinate value "200" and the Y coordinate value "400" which were furthermore shown in the object index value "1" columnand the bit map index value "2" of the "Normal Bitmap" column is read.

[0167]Thenthe reception control part 5126 will output the bit map data and the coordinate value which were read to the regenerating section 5128if current time becomes a value "5" of "start_time" of the earned-hours table 6306. On the other handthe video data 5201 ("Video0.m2v") separated by the TS decoder part 5123 and the voice data 5203 ("Audio0.m2a") are decoded by the AV decoder part 5124and are outputted to the regenerating section 5128 at the regenerating section 5128.

[0168]The regenerating section 5128 outputs the video signal which piled up the bit map which the reception control part 5126 outputted on the image data 5201 outputted from the AV decoder part 5124. The display image in this case is shown in drawing 34 (a). The display image 7901 of the figure is equivalent to the scene 01b shown in drawing 5and the "details of Osaka" button expressed with the bit map on the animation and the button "which looks at Kanto" are displayed. Among thesethe "details of Osaka" button is the display of the selective state according to variable cur_focus.

[0169]This displaying condition is continued until the contents change according to the user's operation to the value "65" of "end_time" shown in the earned-hours table 6306 in NVT (00) is made. When current time becomes a value of "end_time"and the start time of NVT (01) of the following version comes furtherthe display action is performed like the above.

The display image of the scene 01bi.e.drawing 34(a) shown in drawing 5 shall be displayed now [user I/F processing] by 1-3-10-3.** navigation information.

[0170]When the signal of user operation is received from the signal receive section 5127 and the signal of the user operation is a "right" keythe reception control part 5126Update the value of variable cur_focus to "1" and the navigation information table storage part 5132 is referred toRead the bit map data corresponding to the bit map index value "3" shown in the "Focused Bitmap" column of the button object of the object index value "1" of NVT (00) shown in drawing 17and An X coordinate "200"It outputs to the regenerating section 5128 with a Y coordinate "400." About the button object of the object index value which is not in agreement with the value "1" of variable cur_focusit asks for bit map data from the "Normal Bitmap" columnand outputs to the regenerating section 5128 similarly.

[0171]In the "details of Osaka" button 02b which this showed to drawing 34 (a)the button 03b "which looks at Kanto" will change [a selective state] to a non selection state. When the signal of user operation is furthermore a "left" keythe value of variable cur_focus will be updated by "0" and will return to the displaying

condition of drawing 34 (a) again. When the signal of user operation is a "definite" keyThe reception control part 5126 reads a script from the hair drier of a button object with an object index value of NVT (00) shown in drawing 17 equal to cur_focus "0" with reference to the navigation information table storage part 5132. In this casesince the script is "goto_contents (HyperIndex0)"the various identifiers of the contents of the link destination corresponding to the hyperlink index value of an argument are readand change processing of contents is performed as follows.

1-3-10-4.** contents change processing -- in the state where the display image of drawing 34 (a) is displayed as mentioned above. When the signal of user operation is a "definite" key that isthe case where it switches to the scene 11b of the contents 1 from the scene 01b of the contents 0 in drawing 5 is explained.

[0172]In this casethe various identifiers of the contents of the link destination corresponding to the hyperlink index value "0" in NVT (00) are read as mentioned above. In various identifierssince all identifiers other than "NE_id" are "-"The identifier of the transport stream to which the contents of a link destination belong and the image data of the contents of a link destinationvoice datathe identifier of the service to which each of navigation information belongsand the identifier of an eventAbout the identifier of the image data of the contents of a link destinationand the identifier of voice datait expresses that it is equal to the identifier of the contents reproduced nowrespectively. That isthe image data of the contents of a link destination and voice data are the same as the contents under present reproductionand mean that only navigation information differs.

[0173]The reception control part 5126 reads the value "0x0001" of the identifier "NE_id" of navigation informationand sets it as "table_id_extension" of the filter condition of the navigation information table in the filter condition storage parts store 5131. Nextthe reception control part 5126 refers to Table 7004 of PMT7001 in the system-information table storage part 5133The value "0x0093" of PID of the component in which "NE_Component_Descriptor(1)" 7201 in which "0x0001" is contained were given between the value of "min_NE_id" and the value of

"max_NE_id" is readIt is similarly set as "PID" of the filter condition of a navigation information table. "version_no" of the filter condition of navigation information is set up without conditions.

[0174]According to the set-up filter conditionthe TS decoder part 5123 separates "NVT (10)" shown in drawing 18and the navigation information table storage part 5132 is made to memorize itand it notifies that to the reception control part 5126. The reception control part 5126 sets the value which added "1" to the version number "0" given to separated NVT (10) as the filter condition "version_no" column. It prepares for the case where navigation information is upgraded by this.

[0175]According to "NVT (10)" memorized by the navigation information table storage part 5132the above-mentioned ** display action and ** user I/F processing are performed. The display screen reproduced according to "NVT (10)" shown in drawing 34 (b) is shown. Although a video data and voice data are the same to drawing 34 (a)since navigation information differsthe button differs from text.

[0176]When a user inputs a "definite" key using a remote control etc. in the state where the display image 7903 shown in drawing 34 (c) is displayed on the indicator 5129 that isthe case where it switches to the scene 11e of the contents 1 from the scene 01e of the contents 0 in drawing 5 is explained. In this casethose without a condition set them to the filter condition "PID" of the filter condition storage parts store 5131 by "0x0093"are set to "table_id_extension" by "0x0001"and are set to "version_no" by the reception control part 5126. TherebyNVT (1, 1)shown in drawing 20 is separated from the transport stream shown in drawing 29 by the TS decoder part 5123and it memorizes at the navigation information table storage part 5132. The reception control part 5126 performs the above-mentioned ** display action and ** user I/F processing according to "NVT (11)." As a resultthe display image 7904 shown in drawing 34 (d) is displayed.

[0177]Thenwhen a user inputs a "definite" key using a remote control etc. in the state where the display image 8001 of drawing 35 (a) is displayed on the

indicator 5129 that isthe case where it switches to the scene 21a of the contents 2 from the scene 01a of the contents 0 in drawing 5 is explained. The reception control part 5126 reads a script "goto_contents" and the index value "1" of the argument with reference to the object definition hair drier definition Table 6302 and 6303 of the navigation information table 6301 in the navigation information table storage part 5132.

[0178]Furthermorethe reception control part 5126 reads the identifier of the contents of the link destination corresponding to an index value "1" from the hyperlink table 6304. The identifier of the transport stream to whichas for the reception control part 5126the contents of a link destination belong and the image data of the contents of a link destinationvoice dataand the identifier of the service to which each of navigation information belongsIt judges with it being equal to the identifier of an eventand acquisition processing of PMT is not performed. Since the identifiers of image datavoice dataand navigation information differthese reception will be switched.

[0179]The reception control part 5126 reads the value "0x01" of the identifier "VE_comp_tag" of image dataTable 7004 of PMT7001 in the system-information table storage part 5133 is given to stream_identifier_descriptor of "0x01" to the value of reference "component_tag"And the kind of data transmitted reads the value "0x0097" of PID of the component which is image dataand it is set as "PID" of the filter condition of the image data in the filter condition storage parts store 5131.

[0180]The reception control part 5126 reads the value "0x01" of the identifier "AE_comp_tag" of voice dataTable 7004 of PMT7001 in the system-information table storage part 5133 is given to stream_identifier_descriptor of "0x01" to the value of reference "component_tag"And the kind of data transmitted reads the value "0x0099" of PID of the component which is voice dataand it is set as "PID" of the filter condition of the voice data in the filter condition storage parts store 5131.

[0181]The reception control part 5126 reads the value "0x0002" of the identifier

"NE_id" of voice dataWhile setting it as "table_id_extension" of the filter condition of the navigation information table in the filter condition storage parts store 5131Table 7004 of PMT7001 is referred toThe value "0x0094" of PID of the component in which "NE_Component_Descriptor(2)" 7203 in which "0x0002" is contained were given between the value of "min_NE_id" and the value of "max_NE_id" is readIt is similarly set as "PID" of the filter condition of a navigation information table. And "version_no" of the filter condition of a navigation information table is set up without conditions.

[0182]The TS decoder part 5123 separates the navigation information table 6701 of the file name "NVT (20)" shown in drawing 21 from the transport stream shown in drawing 29and the navigation information table storage part 5132 is made to memorize itand it notifies that to the reception control part 5126. The display image 8002 of drawing 35 (b) is similarly displayed on the indicator 5129 by this.

1-3-11. In the interactive program shown in example drawing 5 of contents composition which utilized the scriptthe contents 0-3 had one navigation information tablerespectively. In other wordsa navigation information table and contents supported 1 to 1. Herea navigation information table and contents explain the example of contents composition made to correspond to one-pair **and the example of contents composition made to correspond to 1 to 1 by utilizing a script.

[0183]Drawing 43 shows the example of other interactive programs which consist of the four contents 10-13. The presentation information which is a component of the contents 10-13 shall be the video data "Video1.m2v" and voice data "Audio1.m2a" which were shown in drawing 6 (a) and (c)respectively. That isa video data "Video1.m2v" and voice data "Audio1.m2a" are shared by four contents.

[0184]About the navigation information which is a component of the contents 10-13two kinds of data configurations as follows occur. As the 1st data configurationnavigation information in case navigation information and contents are 1 to 1 is shown in drawing 44 - drawing 47. The navigation information

"Navi10-1.nif" in drawing 44 supports each scene in the contents 10 illustrated to drawing 43. Each button of a "northern part"the "central part"and the "southern part" in each scene of the contents 10 is expressed by the button object of the object index values 01and 2 in the object definition table of "Navi10-1.nif"respectively. Furthermoreas shown in a hair drier definition table and a hyper-link tablelinking of each button of a "northern part"the "central part"and a "southern part" is carried out to the contents 1112and 13.

[0185]The navigation information "Navi11-1.nif" in drawing 45 supports each scene in the contents 11 illustrated to drawing 43. The text (northern weather information) in each scene of the contents 11 is expressed by the picture object of the object index value 1 in an object definition table. The button "returning" is expressed by the button object of the object index value 0and is made into the contents 10 with the link.

[0186]The same may be said of the navigation information "Navi12-1.nif" of drawing 46and the drawing 47 navigation information "Navi13-1.nif." In the 1st data configurationby the data configuration such four navigation information "Navi10-1.nif"Navi11-1.nifNavi12-1.nifand "Navi13-1.nif." The linking between contents is expressed as each button of the contents 10-13and each text.

[0187]As the 2nd data configurationnavigation information in case navigation information and contents are one-pair Oshi is shown in drawing 48. The navigation information "Navi10_13-1.nif" in drawing 48 supports each scene in the four contents 10-13 illustrated to drawing 43and is expressing all of the objects currently expressed by four navigation information shown in drawing 44 - drawing 47.

[0188]In the object definition table of the figureseven objects of the object index values 0-6 contain all the button objects and all the picture objects which were shown in drawing 44 - drawing 47and the "visibility (visibility)" column is newly added. The "visibility (visibility)" column in this object definition table shows [whether an object is shown to a user and] whether it does not show or [that is] is effectivewhen it changes from other contents to the contents 10 first. When the

bit map showing a buttontextetc. is displayed and a button becomes final and conclusive an effective object by user's operation furthera hair drier (script) is performed. An invalid object is not displayed but the hair drier is disregarded.

[0189]Thereforewhen these contents are reproduced first according to this object definition tableSince only the object of the object index values 0-2 is effectivethe "northern part"the "central part"and "southern part" button (for focuses one and for normal two) shown in the bit map index values 0-5 is displayed. As a resultthe contents 10 of drawing 43 are reproduced.

[0190]The script in a hair drier definition table expresses the program which performs the change of four contents. This script is a simple combination of the "hide_object()" command which makes a display eliminate an object (it repeals)and the "show_object" command on which an object is displayed (it validates). for example-- contents -- ten -- inside -- "a northern part" -- a button -- a user -- selection -- and -- becoming final and conclusive -- having -- a case -- the -- "a northern part" -- a button -- an object (index value 0) -- a hair drier (hair drier index value 0) -- starting -- having . According to the script of this hair driera "button object of object index values 01and 2i.e.northern partcentral part"and "southern part" button becomes invalid. The button object of the object index value 3 and the button is got blocked and "returns" become effectiveand the picture object of the object index value 4i.e.northern textbecomes effective.

[0191]As a resulta display will be changed from the contents 10 shown in drawing 43 to the contents 11. During reproduction of the contents 10a user chooses and becomes final and conclusiveand the "central part" or the "southern part" button of a case is the same. For examplewhen the button "returns" during the contents 11 and 12 or reproduction of 13 is chosen and become final and conclusivethe hair drier (hair drier index value 3) of the object (object index value 3) of the button "returning" is started. according to this script -- three button objects (object index values 0-2) -- it is got blockeda "northern part"the "central part"and "southern part" button becomes effectiveand other objects (picture objects 4-6) become invalid. As a resulta display will be changed to the contents

10 shown in <u>drawing 43</u>.

[0192]Thuswhile recording many objects into one navigation informationthe combination of the object (it is effective) which should be displayed in a script is programmable. That isone navigation information can express two or more contents. In this casesince it becomes unnecessary for the receiving set 5121 to newly receive navigation information for every change of contentsit can make the response to user's operation quick.

1-3-12. In additionin additionas the above-mentioned embodiment was shown in the multiplex information table 6001 of <u>drawing 14</u>the bit rate (NE_component(x)_Bitrate) of the navigation information table was setting every contents to the same 1Mbpsbut. A different value according to the contents of contents may be set up. For examplecontents expected that the referring frequency by user's operation is highsuch as contents which have a role also as a main menumay make the bit rate high. In the interactive program shown in <u>drawing 5</u>the contents 0 and 1 are good also as the bit rate higher than the contents 2 and 3.

[0193]The bit rate may be dynamically changed over the regeneration time of contents. For exampleabout the contents expected for referring frequency to become high in timeor to become lowwhenever a version changesthe bit rate may be changed dynamically. In this casewhat is necessary is just to change the bit rate of the multiplex information table 6001 dynamically. Since each multiplex directions notified to the multiplexing part 5112 from the multiloop control part 5110 by this contain the value of the bit rate of the multiplex information table 6001the multiplex frequency of navigation information will also be changed dynamically.

[0194]When the fixed bit rate is assigned to all the navigation information (when one PID is assigned to all the navigation information)What is necessary is just to adjust the multiplex information table 6001 so that the number of times of creation of multiplex directions of a navigation information table may be countedfor examplethe creation rate of multiplex directions of NVT of the

contents 0-3 may be set to 2:1:1:1.

[0195]Although premised on a video data being a full size of the display screen of the receiving set 5121 in the above-mentioned embodimentit is good also as a video data of size smaller than it. For exampleeven when the maximum of the bit rate which can be assigned to an interactive program is definedthe number of contents can be made to increasesince the bit rate will also be made to about 1/4 if a video data is made into 1/4 size. In this caseit may be made to obtain a reproduced image combining the display of the object by navigation information. It may be made for one more contents to have simultaneously 2-4 video datas of 1/4 size.

[0196]Although the interactive program is broadcast by digital satellite broadcastingit may be made to broadcastfor example from the broadcasting station of cable TV (CATV) in the above-mentioned embodiment. In this embodimenteach navigation information tableThe effective start time "start_time" when the navigation information becomes effectiveThe earned-hours table which defined the broadcast start time of the event which carries out multiplex [of the application memorized by the send data storage parts store 5102 in the effective finish time "end_time" which becomes invalid] by relative time (second bit) set to "0" is includedThe reception control part 5126 of the receiving set 5121The multiplexing part 5112 of the digital broadcasting system 5101 sets the initial value in the head of a transport stream to "0." Although the effective start time of each navigation information and effective finish time are judged with reference to the clock part of the AV decoder part 5124 which counts time in a transport stream synchronizing with the information on PCR which carried out multiplexFor examplesuppose that it has the receiving set 5121 and the clock part which counts absolute time the reception control part 5126With reference to said clock partacquire the present absolute timeand the start time (absolute time) of an event is read from the event information in EIT further memorized by the system-information table generation part 5105It is good by subtracting the start time of an event from the present absolute time also as asking for the relative time which

set broadcast start time of the event to "0"and judging the effective start time of each navigation informationand effective finish time using this.

[0197]In an earned-hours tablestart_timeand "end_time" decide to be recorded in absolute timeIt supposes that the reception control part 5126 is provided with the clock part which counts absolute timeand it cannot be overemphasized that the reception control part 5126 is good also as judging the effective start time of each navigation information and effective finish time with reference to the clock part which counts this absolute time.

[0198]When accuracy is not required of management of the earned hours of each navigation informationThe reception control part 5126 of the receiving set 5121 The effective start time of each navigation informationWhen effective finish time is not judged but the notice of separation of a new navigation information table is received from the TS decoder part 5123it is good also as validating the navigation information table which repealed the navigation information table under present reproductionand was newly separated.

[0199]It may be made to transmit without including an earned-hours table in navigation information. In this casethe earned-hours table of each navigation information is good also as composition whichfor examplemakes a structure information storage part memorizeand a multiloop control part refers to on the occasion of multiplex directions creation separately from navigation information. Although the image data which the presentation information storage part 5107 of the digital broadcasting system 5101 broadcastsand voice data are beforehand memorized altogether in this embodimentFor exampleit is good also as that with which constitute so that it may have a video camera and an encoder which compresses into real time the picture which said video camera photoedand the output of said encoder is remembered to be by real time at the presentation information storage part 5107.

2. The 2nd embodiment book embodiment explains the digital broadcasting system which realizes the interactive program which consists of page base contents.

[0200]In advance of explanation of the composition of a digital broadcasting system the principle which realizes the interactive program which consists of page base contents is explained using drawing 49 - drawing 51. Drawing 49 is an example of the contents displayed on the display screen of a receiver respectively and is a figure about a weather report. here -- the contents 151 and 152 of plurality [weather report / of the whole country and every place]and ... it is shown by 153 and ... two or more of these contents 151 and 152 and ... the display is switched as the arrow marks 154 155 156 and 157 show 153 and ... by a user's operation.

[0201]When the contents 153 which show a national weather report are displayed on the display screen now the button [user] 160 "Tokyo" is switched to the display of selection and the contents 151 a display screen indicates the weather report of Tokyo to be from the contents 153 as the arrow mark 154 shows when determining operation is carried out. Next if a user does determining operation of the button 158 "returning" as the arrow mark 155 shows a display screen will be switched to the display of the original contents 153 from the contents 151.

[0202]If similarly a user does the button 161 in which "Osaka" of the display screen of the contents 153 is shown in selection and determining operation as the arrow mark 156 shows a display screen will be switched to the display of the contents 153 to the contents 152. If a user does determining operation of the button 159 "returning" in this state as shown in the arrow mark 157 a display screen will return to the state of the contents 153. For operation of such a display change the contents 151 and ... have the buttons 158 159 160 and 161. In addition to these buttons each contents can also have a button for the change to the stream base contents shown in a 1st embodiment.

[0203]Since the display of contents is arbitrarily switched by operation of the above display changes of a user by it each contents have been transmitted at the transmitting side so that it may explain below. Drawing 50 is a figure showing typically the send data transmitted from the transmitting side. The send data 165

consists of data (information) in which two or more contents are shownand repeating transmission of the whole is carried out. the send data 165 -- two or more image data 166 and 167 and ... it resembles 168 and ...respectively and consists of the corresponding navigation information 169170...171 and ...

[0204]Each image data 166 and ... become each contents 151 displayed on the display screen of a receiverand a main image of ...and this explanation shows the picture of the weather report. The bit map (Bitmap) data 172173and 174 in which the button 158 and ... are shown for exampleeach navigation information 169 and ... are piled up and displayed on each image data 166 and ...The script (Script) information 175176and 177 which described the behavior to operation of the user in a receiverThe hyperlink (Hyperlink) information 178179and 180 which shows the contents of the link destination which can carry out the display change of the contents by a user's operation is included.

[0205]The contents 151 shown in drawing 49 are expressed by the image data 166 and the navigation information 169. Similarlythe contents 152 are expressed by the image data 167 and the navigation information 170and the contents 153 are expressed by the image data 168 and navigation information. That iseach image data 166...each navigation information 169 and ... have correspondence relationsand are provided.

[0206]Drawing 51 is a figure showing typically the situation of transmission of the send data 165 transmitted from the transmitting side. In the transmitting siderepeating transmission of the send data 165 is carried out. It is understood that the repeating transmission data 165 is transmitted in time. Howeverin this figurealthough the frame structure also shows image data and navigation informationIn order to be digitizedand to multiplex image data and corresponding navigation information actually and to transmit the send data 165 as an MPEG2 transport streamit should be cautious of concrete send data differing from this figure.

[0207]Although a graphic display is not carried outidentification information is attached in order that each image data 166167...168 transmitted and ... may

discriminate from other image data 166167...168 and ... Identification information is attached in order to discriminate from other navigation information 169170...171 to each navigation information 169170...171 similarly.

[0208]On the other handin a receiveras this identification information in the send data 165 is supervisedthe image data and navigation information containing desired identification information are acquired and it was shown in drawing 49 as contents of 1a repeat display is carried out as the contents 151. For exampleit was acquiredthe navigation information 171 is memorized in preparation for a user's predetermined operation.

[0209]Hereafterthe digital broadcasting system applied to this embodiment based on the above-mentioned principle is explained with reference to drawings.

2-1. Digital broadcasting system (page base)

Drawing 52 is a lineblock diagram of the digital broadcasting system concerning a 2nd embodiment. This digital broadcasting system consists of the data source 101 and two or more data receivers 121.

[0210]The data source 101 is provided with the following.

It is constituted so that multiplex [of the data of two or more page base contents in which the hyperlink was stretched mutually] may be carried out into an MPEG2 transport stream and repeating transmission may be carried outand it is the send data storage parts store 102.

Data multiplexing part 103.

Multiplex information storage parts store 104.

The system-information table generation part 105 and the transmission section 106.

[0211]The data receiver 121 is provided with the following.

It is constituted so that contents may be taken out interactively and it may reproduce according to user's operation out of the MPEG2 transport stream transmitted from the data source 101and it is the receive section 122.

TS decoder part 123.

AV decoder part 124.

The receiving data storage part 125the reception control part 126the signal receive section 127the regenerating section 128the indicator 129and the voice output part 130.

2-2. The composition send data storage parts store 102 of the data source 1012-2-1. send data storage parts store 102 is provided with the following.

It consisted of storagessuch as a magnetic disktwo or more data and structure information on contents which constitute one interactive program are memorizedand it is the presentation information storage part 107.

Navigation information storage parts store 108.

Structure information storage part 109.

The interactive program is called here the "event" or the "program" in the state where it is contained in an MPEG2 transport stream as send data.

[0212]It divided into image data (presentation information) and navigation informationand the send data storage parts store 102 has memorized the send data 165 shown in drawing 50as shown below. The correspondence relation between image data and navigation information is memorized as a structure information table.

2-2-1-1. The presentation information storage part 107 presentation information storage part 107 memorizes the presentation informationincluding image datavoice dataetc.included in each contents. Drawing 53 (a) and (b) shows the still picture data which is an example of the presentation information on the contents 153 and 151respectively. Drawing 53 (a) shows the still picture data 201 shown by a file name "still5.m2v"and drawing 53 (b) shows the still picture data 202 shown by a file name "still1.m2v." The still picture data 201 and 202 is memorized in the form by which digital coding was carried out based on 13818 to ISO/IEC2 (MPEG 2 video) standardrespectively. Other forms may be sufficient as the coding format of image data.

2-2-1-2. The navigation information storage parts store 108 navigation-

information storage parts store 108 memorizes the navigation information included in each contents. The hyperlink information which shows the link to another contents is included in navigation informationand the object for a user to choose this link destination interactively is described. Drawing 54 shows an example of navigation information. Herethe navigation information 301 is an example of the navigation information of the contents 153and is memorized by the file name "navi5.nif."

[0213]It is shown in the structure information table 501 shown in drawing 56 mentioned later that the still picture data 201 shown in drawing 53 (a) and the navigation information 301 shown in drawing 54 constitute the one contents 153. The navigation information 301The object definition table (Object.) shown according to the tabular format Definition Table302the hair drier definition table (Handler Definition Table) 303the hyperlink table (Hyperlink Table) 304and the bit map table (Bitmap Table) 305 are included. This navigation information 301 differs in that it does not have an earned-hours table compared with the navigation information 5301 shown in drawing 7and except thissince it is substantially the sameit omits explanation. In drawing 54each column of an "object index"the "hair drier index"the "hyperlink index"and the "bit map index" is only abbreviated to the "index."

[0214]Drawing 55 shows the navigation information 401 expressed with a file name "navi1.nif." "-" is shown as an index number of a standard bit map by the line of the index number "0" of the object definition table 402 in the figure. This shows that the bit map of a normal condition is not defined as this object. In the object definition table 402only one is definedbut since the object of an index number "0" is always displayed by a selective state and the bit map of a normal condition is unnecessaryan object is omitted.

2-2-1-3. The structure information storage part 109 structure information storage part 109 has memorized a structure information table and entry information. A structure information table is information on the combination of presentation information and navigation information which constitutes each contents. Entry

information says the information which shows entry contents.

[0215]As shown in drawing 56the structure information table 501 shows the information on the combination of the presentation information and navigation information which constitute each contents memorized by the send data storage parts store 102 for every contents number. A contents number is a number which identifies one contents uniquely in two or more contents memorized by the send data storage parts store 102. As shown in drawing 56in the 1st line of the structure information table 501. The still picture data in which the contents identified by the contents number 0 are identified by file name still0.m2v memorized by the presentation information storage part 107Being constituted by the group with the navigation information identified by navi0.nif memorized by the navigation information storage parts store 108 is shown. Other lines are the same.

[0216]The entry information 502 shown in drawing 56 shows that the contents number of the entry contents of the interactive program memorized by the send data storage parts store 102 is 5.

2-2-2. The multiplex information storage parts store 104 multiplex-information storage parts store 104 has memorized the quota information on resourcessuch as an identifier for multiplexing the send data memorized by the send data storage parts store 102 in an MPEG2 transport streamand a zoneas a multiplex information table. Drawing 57 shows an example of this multiplex information table 601.

[0217]Bit rate (Bitrate) currently recorded on the 1st line of the multiplex information table 601 shows the transmission rate assigned when carrying out multiplex [of the send data memorized by the send data storage parts store 102] to an MPEG2 transport stream. In this example6Mbps is assigned as a transmission rate. original_network_id of the 2nd line - the 5th line of the multiplex information table 601transport_stream_idservice_idand event_id were already explained in drawing 14.

[0218]When the 6th line - the 10th line of the multiplex information table 601

carry out multiplex [of the application memorized by the send data storage parts store 102] as an event into an MPEG2 transport streamit expresses the value of PID assigned to each component which constitutes the event. PMT_PID and PCR_PID express the value of PMT (Program Map Table) mentioned laterrespectively and PID assigned to PCR (ProgramClock Reference).

[0219]NE_component_pid (navigation information component packet identifier) shows the value of PID assigned to the component which carries out multiplex [of the navigation information memorized by the navigation information storage parts store 108 of the send data storage parts store 102].

VE_information_component_pid (stream matching information component packet identifier) shows the value of PID assigned to the component which carries out multiplex [of the stream conversion table generated by the stream matching information table generation part 111 mentioned later].

[0220]VE_component_pid (image data component identifier) shows the value of PID assigned to the component which carries out multiplex [of the image data memorized by the presentation information storage part 107]. In this examplealthough only one PID is given as NE_component_pidVE_information_component_pidand VE_component_pidrespectivelymore than one may be given. namelyNE_component_pid -- "0x0083" is given to VE_information_component_pidand "0x0084" is given to VE_component_pid as PIDrespectivelyhowever "0x0082." in additionNE_component_pid -- "0x0086" may be given to VE_information_component_pid and "0x0087" may be given to VE_component_pid for "0x0085" as PIDrespectively.

[0221]Although it does not exist in this examplewhen send data contains voice dataAE_information_component_pid and AE_component_pid are assigned like image data.

2-2-3. The constitution data multiplexing part 103 of the data multiplexing part 103 is provided with the following.

The multiloop control part 110 which consists of a CPU and a memory.

Stream matching information table generation part 111.

Identifier information adjunct 112.

The navigation information table generation part 113 and the multiplexing part 114.

[0222]The data multiplexing part 103 performs the following processings in order to generate the send data 165 shown by drawing 51.

2-2-3-1. Multiloop control part 110 (the 1)

If the multiloop control part 110 is started by the transmission section 106it will first refer to the structure information table 501 and the multiplex information table 601 which are memorized by the structure information storage part 109 and the multiplex information storage parts store 104The identifier which identifies each contents uniquely in digital broadcasting for every contents number is assignedand a content identifier assignment table is created.

[0223]Drawing 58 shows an example of this content identifier assignment table 701. Since it is the same as already explained drawing 15each column in the identifier assignment table 701 of the figure is explained focusing on the identifier mainly used for page base contents here. "VE_id" 709 expresses the value of the identifier which identifies the image data of page base contents uniquely in one event. "AE_id" 713 expresses the value of the identifier which identifies voice data uniquely similarly. "NE_id" 710 expresses the value of the identifier which identifies navigation information uniquely in one event.

[0224]According to this embodimentin order to identify one page base contentsVE_idAE_idand "NE_id" are used. On the other handin a 1st embodimentin order to identify one stream base contentsVE_comp_tagAE_comp_tagand "NE_id" are used. Thereforethe "VE_comp_tag" column in the figure and the "AE_comp_tag" column are recorded as "-."

[0225]In this examplethe same value as the contents number 702 is given to "VE_id" 709 and "NE_id" 710. "VE_id" 709 and "NE_id" 710 do not need to be in

agreement with the contents number 702and every image data and a different value for every navigation information should just be givenrespectively. In this examplesince "AE_svc_id" 711AE_event_id712and "AE_id" 713 do not have voice data in contentsan identifier is not given but "-" is written inbut. When voice data is includedit is assigned like image data and navigation information.

[0226]The multiloop control part 110 creates the display image information identifier assignment table which assigned each value of "PID"component_tagand "stream_id" for every image dataafter creation of the content identifier assignment table 701 finishes. Drawing 59 is a figure showing an example of this display image information identifier assignment table 801. In this display image information identifier assignment table 801the value given in the identifier assignment table 701 is given to "VE_id" 709. The value (here "0x0084") assigned by "VE_component_pid" in the multiplex information table 601 is given to 803. "component_tag" (component tag) The same value (for examplethe value "0x00" of "component_tag" is assigned to the value "0x0084" of "PID") is given to 802 to one 803. "stream_id" 804the value of "ef" is cyclically given one by one from "e0" by the hexadecimal notation corresponding to "VE_id" 709. The file name of the image data memorized by the presentation information storage part 107 identified by these "VE_id" 709 is written in as the image data file 805.

[0227]When two or more identifiers are given to VE_component_pid of drawing 57PIDand "stream_id" can be assigned as followsfor example. In order of "VE_id"firstone VE_component_pid is taken out and given to "PID" from a multiplex information tableand "stream_id" gives the value of "e0" - "ef" cyclically one by one by the hexadecimal notation. Whenever stream_id takes a roundVE_component_pid newer than a multiplex information table is taken outand it gives "PID." If new VE_component_pid is lostit will return to VE_component_pid given first. "component_tag" -- "-- a value which is different in every PID" is given.

[0228]It may be made to use only a part although it supposes that all 16 of "e0" -

"ef" will be used by the hexadecimal notation which can be used as a value of stream_id for picture image data in this example. When there is voice datait is defined by the MPEG 2 standard that stream_id uses 32 of "c0" - "df" by the hexadecimal notation.

[0229]These "component_tag" 802 are used in order to refer to PID indirectly. component_tag is the value which PID was made to correspond to 1 to 1and was freely assigned to itand the correspondence relation between component_tag and PID is given in PMT mentioned later. Out of navigation information and stream matching information. By not carrying out the direct reference of the value of PIDbut referring to it indirectly using component_tagFor exampleeven when carrying out multiplex to other programs and PID is rewritten by another value in the transmission section 106 which mentions laterit is effective in not changing navigation information and stream matching information.

[0230]After creation of the display image information identifier assignment table 801 ends the multiloop control part 110It points so that a stream conversion table may be generated to the stream matching information table generation part 111it points so that VE_id may be added to the private area of image data at the identifier information adjunct 112and it directs to generate a navigation information table to the navigation information table generation part 113.

2-2-3-2. The identifier information adjunct 112 identifier-information adjunct 112 will read the image data memorized by the presentation information storage part 107if directions of addition of identifier information are received from the multiloop control part 110. Image data identifier VE_id is written in the private area in the read picture data bit stream. VE_id is acquired with reference to the display image information identifier assignment table 801 created in the multiloop control part 110. A file name is given to the picture data bit stream which wrote in VE_idand it memorizes to a storage area (not shown).

[0231]Drawing 60 shows the bit stream 901 of an example of the image data of the file name "VE (5)" to which identifier information was added. The bit stream 901 is coded based on the MPEG 2 standardand the value "0x0005" of VE_id is

recorded on the user data area 903 of the picture header 902. The still picture data 201 shown in drawing 53 (a) is recorded on the picture data field 904. If identifier information is added to all the image datathe end of addition will be notified to the multiloop control part 110.

[0232]In this exampleas a field which writes in VE_idalthough the user data area in a picture header was usedthe field which can write in other private data may be used.

2-2-3-3. The navigation information table generation part 113 navigation-information table generation part 113 will read the navigation information memorized by the navigation information storage parts store 108if directions of generation of a navigation information table are received from the multiloop control part 110. When the read navigation information includes a hyperlink tablethe information on the link destination written by the contents number is changed into the notation of each identifier with reference to the content identifier assignment table 701and a navigation information table is generated. When a hyperlink table is not includedwith the original navigation informationonly a file name is changed and a navigation information table is generated. The generated navigation information is memorized to a storage area (not shown).

[0233]Drawing 61 shows the navigation information table 1001 of the generated file name "NVT (5)." This navigation information table 1001 is generated from the navigation information of the file name "navi5.nif" shown in drawing 54. The navigation information table 1001 includes the object definition table 1002the hair drier definition table 1003the hyperlink table 1004and the bit map table 1005.

[0234]Drawing 62 shows the navigation information table 1101 of a file name "NVT (1)." This navigation information table 1101 is generated from the navigation information of the file name "navi1.nif" shown in drawing 55and since there is no hyperlink tablethere is no change in the contents. The navigation information table generation part 113 notifies the end of generation to the multiloop control part 110after ending generation of a navigation information table.

2-2-3-4. The stream matching information table generation part 111 stream

matching information table generation part 111 will generate a stream conversion table for every image data with reference to the display image information identifier assignment table 801if directions of generation of a stream conversion table are received from the multiloop control part 110. This stream conversion table is used in order to take out one image data out of the stream transmitted to the data receiver 121 from the data source 101.

[0235]Drawing 63 (a) shows stream conversion table "VET(5)"1201 used in order to take out the image data "VE (5)" by the data receiver 121 side. "first_pts" of this stream conversion table 1201 can express the start regeneration time information that the time when the corresponding frame of the beginning of image data is reproduced was expressed with 1/90000 second bitfor examplecan search for it using (several 1).

[0236]

[Equation 1]

[0237]hereS_VE(x) image data VE(x) memorized in the storage area of the identifier information adjunct 112 according to an MPEG 2 system standard (the following -- the same)The size at the time of changing into a transport stream packet and S_NVT(x)The size at the time of changing into a transport stream packet navigation information table NVT(x) memorized in the storage area of the navigation information table generation part 113S_VET is the size at the time of changing into a transport stream packet the one stream conversion table VET memorized in the storage area of the stream matching information table generation part 111. The unit of size is a bit. R expresses the number of times which repeats and carries out multiplex [of the stream conversion table VET]and takes the integral value from "1" to "" (PxS). P is the number of PID assigned for the component which transmits the image data assigned by the multiplex information storage parts store 104and is "1" in this example here. S expresses the number of stream_id used in the display image information identifier

assignment table 801and is "16" in this example. B is the bit rate and is "6Mbps" in this example.

[0238]S_VE(x) applies the size for a required PES packet header and trailer information to the size of VE(x) for every PES packet unitand also applies the size for a required transport packet header and trailer information for every unit of a transport packetand is calculated. S_NVT(x) applies the size for a required section header and trailer information to the size of NVT(x) for every section unitand also applies the size for a required transport packet header and trailer information for every unit of a transport packetand is calculated. S_VET applies and asks the size of VET for sizessuch as a section headerlike S_NVT(x). In this examplethe size of all the VET(s) supposes that it is the same. The details of the PES packetthe transport packetand the section are defined by the MPEG 2 system standard.

[0239]"last_pts" of this stream conversion table 1201The information on end regeneration time that the time when the corresponding frame of the last of image data is reproduced was expressed with 1/90000 second bit is expressedand in this examplesince image data is a still picturelast_pts(end regeneration time information) and "first_pts" are in agreement.

[0240]component_tag of the stream conversion table 1201 and stream_id acquire the value of component_tag assigned to image data corresponding with reference to the display image information identifier assignment table 801and stream_id. Drawing 63 (b) shows the 1st stream conversion table 1202 of image dataand drawing 63 (c) shows the 15th stream conversion table 1203 of image data.

[0241]The time "0" used as the standard of "first_pts" of these stream conversion tables 12011202and 1203 and "last_pts" is the time when multiplex [of the data memorized by the send data storage parts store 102] was carried out atand it was first transmitted into the transport stream. Although this example indicated the value of component_tag assigned to the stream conversion table with reference to the display image information identifier assignment table 801It may

change to the value of component_tag and the value of VE_component_pid assigned in the multiplex information table 601 may be indicated directly.

2-2-3-5. Multiloop control part 110 (the 2)

The multiloop control part 110 will determine the contents T [several] of a repeating unitif the notice of the purport that each processing was ended is received from the identifier information adjunct 112the navigation information table generation part 113and the stream matching information table generation part 111. If the contents T [several] of a repeating unit are said simplywhat totaled the total M of contents and the number of dummy contents which are contained in the send data 165 shown in drawing 51 will be said hereCorrectlyT used as M<=PxSxn=T is said as the total M of the contents memorized by the send data storage parts store 102. P expresses with the multiplex information storage parts store 104 here the number of PID assigned to the component for transmitting image data in a similar manner that it explained above (several 1)and S expresses the number of stream_id that it explained above (several 1) similarly. n is the minimum integer with which it is satisfied of M<=T. In this examplesince it is P= 1S= 16and M= 63T is set to 64. When the contents T [several] of a repeating unit are larger than the total M of contentsthe multiloop control part 110 carries out multiplex [of the null packets for the size more than the minimum contents (T-M) individual part]after carrying out multiplex [of all the contents] into a transport stream. Therebyit can guarantee that the interval D of the multiplex position of the stream conversion table corresponding to image data and its image data becomes beyond constant value (more than double [of the size of the minimum contents] (PxS-1)).

[0242]Nextthe multiloop control part 110Gone around length [of the contents T / several / of a repeating unit] L (when it carries out multiplex [of the null packets of all contents and the size for a contents (T-M) individual] by the bit rate B memorized by the multiplex information storage parts store 104.) the length of a ** transport stream -- 1/90000 second bit -- a table -- the bottom calculates a value using (several 2).

[0243]

[Equation 2]

[0244]HereM and T are with the total of above-mentioned contentsand the number of contents of a repeating unitand are the same as that of the explanation mentioned above (several 1) about S_VE(x)S_NVT(x)S_VETPand B. The multiloop control part 110 sets "0" as the contents counter iand sets "0" as the multiplex starting position wp. The value of wp expresses the time from the information position of the beginning of the contents which carry out multiplex to a transport stream.

[0245]Next0is set as the value of the VET counter j. The number C of the circumference and the contents number N are searched for using the value of the VET counter j. The number C of the circumference is an integral part of the quotient of {i+(PxS)-1-j} /Tand the contents number N is remainder of {i+(PxS)-1-j} /T. Nextit is judged whether Nth VET (N) of the stream conversion table is memorized by the stream matching information table generation part 111When memorizingthe value which multiplied by the number C of the circumference at length L of the contents T [several] of a repeating unit gone around is applied to first_pts of VET (N)and last_pts.

[0246]Nextit directs multiplex [of this VET (N)] to the multiplexing part 114. Under the present circumstancesnotify the multiplex starting position wp and the bit rate Band the value of "VE_information_component_pid" in the multiplex information table 601 is notified as PIDThe value of "VE_id" corresponding to the contents number "N" of the content identifier assignment table 701 is notified as table_id_extension.

[0247]When VET (N) is not memorized by the stream matching information table generation part 111it points to multiplex [of the null packets for the size of S_VET] to the multiplexing part 114and the multiplex starting position wp and the bit rate B are notified. After directing multiplexing to the multiplexing part 114the

multiplex starting position wp is calculated. It is calculable by wp=wp+S_VET/B. Next1is added to the value of the VET counter jand it judges whether the value with the number of times R of repetition multiplex of the VET counter j and a stream conversion table is in agreementand when not in agreementthe number C of the circumference and the contents number N are calculated furtherand the multiplexing processing of VET (N) is continued.

[0248]When it judges that the value of the multiloop control part 110 of both counters correspondsthe number C of the circumference and the contents number N are calculated by the same method as the aboveand it is judged whether the contents of the contents number N are memorized by the identifier information adjunct 112 or the navigation information table generation part 113. When it judges that it memorizesit directs multiplex [of VE (N)] to the multiplexing part 114. Under the present circumstancesthe value of the multiplex starting position wpthe bit rate Bv (N)PIDand stream_id is notified to the multiplexing part 114. The value of PID and stream_id takes out the value of "PID" by which the value of "VE_id" was assigned to the image data of "N"and "stream_id" from the display image information identifier assignment table 801. the bit rate Bv (N) -- the following -- being shown (several 3) -- it calculates.

[0249]
[Equation 3]

[0250]The sign in a formula is the same as that of the above (several 1). It directs multiplex [of NVT (N)] to the multiplexing part 114. Under the present circumstancesthe value of the multiplex starting position wpthe bit rate Bn (N)PIDand table_id_extension is notified to the multiplexing part 114. About PIDthe value of PID assigned to the component assigned to transmission of navigation information with reference to the multiplex information storage parts store 104 is taken out. About table_id_extensionthe value of "NE_id" corresponding to the contents number N is taken out from the content identifier

quota table 701. the bit rate Bn (N) -- the following -- being shown (several 4) -- it calculates.

[0251]

[Equation 4]

[0252]The sign in a formula is the same as that of the above (several 3). Nextthe multiloop control part 110 asks for the multiplex starting position wp by formula wp=wp+{S_VE(N)+S_NVT(N)}/B. When the contents N are not memorizedthe multiloop control part 110 points to multiplex [of the null packets for the size of S_VE(0)+S_NVT (0)] to the multiplexing part 114and notifies the multiplex starting position wp.

[0253]S_VE(k)+S_NVT from which size serves as the minimum in all the contents although size of the null packets which carry out multiplex was made into S_VE (0) of a contents number "0"and total size with S_NVT (0) -- (-- it may be made to carry out multiplex [of the null packets for k)]. Nextthe multiloop control part 110 asks for the multiplex starting position wp by formula wp=wp+{S_VE(0)+S_NVT(0)}/B.

[0254]Next1is added to the value of the contents counter ithe value of the VET counter j is calculated againand the processing after multiplexing of VET (N) is repeated.

2-2-3-6. The multiplexing part 114 multiplexing part 114 carries out multiplex [of the send data 165 shown in drawing 51] into an MPEG2 transport stream. Drawing 64 and drawing 65 attach and depend for identification information on the mimetic diagram shown in drawing 51and are a mimetic diagram of a concrete multiplexed stream. Hereafterthe details are explained.

[0255]The multiplexing part 114 carries out multiplex [of the data] into an MPEG2 transport stream based on the method specified by the MPEG 2 system standard based on the directions from the multiloop control part 110. If multiplex directions of the stream conversion table VET (N) are received from the multiloop

control part 110It carries out multiplex [of the stream conversion table VET (N)] into a transport stream using PID and table_id_extension which read and were specified from the specified multiplex starting position wpand the bit rate B from the stream matching information table generation part 111. If multiplex directions of image data VE (N) are received from the multiloop control part 110It carries out multiplex [of the corresponding image data which added the identifier] into a transport stream using PID and stream_id which read and were specified from the specified multiplex starting position wpand the bit rate Bv (N) from the identifier information adjunct 112. If multiplex [of the navigation information table NVT (N)] is directed from the multiloop control part 110It carries out multiplex [of the navigation information table] into a transport stream using PID and table_id_extension which read and were specified from the specified multiplex starting position wpand the bit rate Bn (N) from the navigation information table generation part 113. If multiplex [of null packets] is directedit will carry out multiplex by the bit rate B which had the null packets for the size specified from the specified multiplex starting position wp specified.

[0256]About PCRthe initial value in the head of the transport stream to generate is set to "0"and it carries out multiplex using PCR_PID notified from the multiloop control part 110. Drawing 64 is a figure showing the example of the transport stream generated by the multiplexing part 114. Multiplex [of the 63 contents memorized by the send data storage parts store 102] is carried out to the transport stream 1701. The value "0x0084" given as PID in the multiplex information table 601 is given to 63 image data VE (0) - VE (62)as stream_id0xe0- "0xef" is given cyclicallyand multiplex is carried out.

[0257]The value "0x0083" given as PID in the multiplex information table 601 is given to the stream conversion table VET (N)and the value same as table_id_extension as an image data identifier "VE_id" is given. the stream conversion table VET (N) -- image data VE -- (-- multiplex is carried out once to every N). The number of times R of repetition multiplex of a stream conversion table is "1."

[0258]The 63 navigation information table NE (0) - NE (62)The value "0x0082" given as PID in the multiplex information table 601 is givenand multiplex [of the value of a navigation information identifier "NE_id"] is given and carried out as table_id_extension. Multiplex [of the PCR1702 including the standard information of time] is carried out.

[0259]In this figurethe one send data 165 shown in <u>drawing 51</u> is a range from the stream conversion table VET (15) to the null packets 1705as the arrow mark 1708 shows. In the transport stream 1701multiplex [of the stream conversion table VET (N)] is carried out to the front position by 15 image data of corresponding image data VE (N). Since 16 stream_id is cyclically given to image databetween image data VE (N) corresponding with the stream conversion table VET (N)multiplex [of another image data which has the same PID as VE (N) and stream_id] is not carried out. Thereforethe data receiver 121 can extract desired image data VE (N) by separating only two or more same PID and the thing which appears among the image data which was able to give stream_id at the very beginningafter acquiring the stream conversion table VET (N). For examplebetween stream conversion table VET(16) 1703 and image data VE(16) 1704other image data which was able to give PID "0x0084" and stream_id "0xe0" does not exist. Thereforefour image data in which the data receiver 121 has PID "0x0084" and stream_id "0xe0"Desired image data VE (16) is renewable by separating image data VE (16) which appears at the back very first of stream conversion table VET(16) 1703 among VE (0)VE (16)VE (32)and VE (48).

[0260]The transport stream 1701 is constituted so that multiplex [of the data of the contents for 15 pieces] may be carried out to the stream conversion table VET (N) between corresponding VE (N). That isafter the stream conversion table VET (N) appearsbecoming more than the time taken for the time D until corresponding image data VE (N) appears to transmit 15 contents of the minimum size at least is guaranteed. If the data receiver 121 interprets the information on a stream conversion table and processing required for separation of image data is performed between this time Dit can reproduce desired image

data certainly. In order to guarantee that the time D turns into more than the transmission time of 15 contents also in near a repeated around going pointmultiplex [of the null packets 1705 for the size of one contents] is carried out to the end of the circumference. Therebywhen straddling an around going point between VET (N) and VE (N)becoming more than the time that also takes the interval of VET(0) 1706 and VE(0) 1707 to transmit 15 contents of the minimum size is guaranteedfor example.

[0261]Drawing 65 is a figure showing the example of the transport stream generated by the multiplexing part 114when the number of times R of repetition multiplex of a stream conversion table is set to "16." In the transport stream 1711multiplex [of the stream conversion table VET (N)] is carried out 16 times from the position of the 15 contents quota of corresponding image data VE (N) before the multiplex starting position of VE (N). Since the data receiver 121 reproduces the image data which acquires a stream conversion table first and corresponds after thatit can reproduce desired image data so quickly that said time D is short. Howeverthe data receiver 121 must interpret a stream conversion table as the time D becoming short at a high speed moreand processing required for separation of image data must be performed. If multiple-times multiplex [of the stream conversion table] is carried outlike the transport stream 1711 with the data receiver 121. When load is lightthe stream conversion table by which multiplex was carried out to the position near image data is acquiredand image data is reproduced at high speedand when load is heavyit becomes possible to perform control which acquires the stream conversion table by which multiplex was carried out to the position far from image dataand reproduces image data certainly.

[0262]The multiplexing part 114 will be outputted to the transmission section 106 one by oneif the transport stream 1701 as shown in drawing 64 is generated.
2-2-4. The system-information table generation part 105 system-information table generation part 105NIT which is the program specification information used with the data receiver 121 for program selection (Network Information Table)EIT

(Event Information Table)SDT (Service Description Table)PAT (Program Association Table) and PMT (Program Map Table) are generated with reference to multiplex information storage parts store 104 grade. Since it is the same as that of the system-information table generation part 5105 of a 1st embodiment about detailsit stops to introduction of the generation result (system-information table) in this embodiment here.

[0263]Drawing 66 (a) An example of NITSDTand EIT which were generated by the system-information table generation part 105 by - (c) is shown. It is a figure showing an example of PAT and PMT which were generated by the system-information table generation part 105 in drawing 67 and drawing 68. Drawing 69 (a) Enntry_Descriptor in PMT generated by the system-information table generation part by - (d)It is a figure showing the details of NE_Component_DescriptorVE_Information_Descriptorand stresm_identifier_descriptor.

[0264]The value of "entry_VE_id"entry_AE_idand "entry_NE_id" is described by "Entry_Descriptor" of drawing 69 (a). This shows that entry contents are page base contents. It differs from "Entry_Descriptor" shown in drawing 25 of this point and a 1st embodiment. That isthe value of "entry_VE_comp_tag"entry_AE_comp_tagand "entry_NE_id" which show that entry contents are stream base contents was described by drawing 25.

2-2-5. If the transmission section 106 transmission section 106 has a scheduler and it becomes given timefor examplefive quotasrather than the transmission start time of an eventit will start the multiloop control part 110. To the transport stream which the multiplexing part 114 will output if event transmission start time comes. NITPATPMT which the system-information table generation part 105 generatedAccording to regulation of a DVB-SI standard and an MPEG 2 system standardmultiplex [of the system-information tablessuch as SDT and EIT] is repeatedly carried out at the interval defined using PID in which it was providedabnormal conditions etc. are processedand it transmits to data receiver 121 grade.

[0265]Drawing 70 is the figure [-izing / **/ the multiplexed transport stream 1801 / the figure / type / in which showing it] and and.
NIT1802PAT1803PMT1804SDT1805and EIT1806 have multiplexed further to the transport stream 1701 multiplexed by the multiplexing part 114.

2-2-6. Explain operation of the data source 101next operation of this example of the data source 101 using the flow chart shown in drawing 71drawing 72and drawing 73.

[0266]Firstthe multiloop control part 110 gives VE_id and NE_id for every contents numberand creates an identifier assignment table (S1902). Nextthe display image information identifier assignment table 801 is created (S1904)Creation of a navigation information table is directed to the navigation information table generation part 113and generation of a stream conversion table is directed for addition of identifier information to the identifier information adjunct 112 at the stream matching information table generation part 111.

[0267]The identifier information adjunct 112 adds and memorizes an image data identifier to the private area of the bit stream of the image data memorized by the presentation information storage part 107. That is notified to the multiloop control part 110 that addition of the identifier about all the image data is ended (S1906). The navigation information table generation part 113 creates a navigation information table from the navigation information memorized by the navigation information storage parts store 108. That is notified to the multiloop control part 110 that creation of all the navigation information tables is completed (S1908).

[0268]The stream matching information table generation part 111 generates a stream conversion table with reference to the display image information identifier assignment table 801 which the multiloop control part 110 created. After ending generation of all the stream conversion tablesit notifies to the multiloop control part 110 that (S1910). The system-information table generation part 105 generates various kinds of system-information tablessuch as NITSDTEITPATand PMT (S1912).

[0269]The multiloop control part 110 determines the contents T [several] of the

repeating unit at the time of carrying out multiplex [of the contents] to a transport stream (S1914). Length L for 1 round of the contents T [several] (the length of a transport stream when it carries out multiplex [of all contents and the null packets for the size of a contents M-T individual] by the bit rate B memorized by the multiplex information storage parts store 104) is calculated by 1/90000 second bit (S1916). The multiloop control part 110 notifies PCR_PID to the multiplexing part 114and directs multiplexing of PCR (S1918). Next0is both set to the contents counter i and the multiplex starting position wp (S2002).

[0270]Nextthe multiloop control part 110 sets "0" as the VET counter j (2004). The number C of the circumference and the contents number N are searched for. C is a quotient (integral part) of {i+(PxS)-1-j} /T -- N -- the -- remaining (integer) -- it is (S2006). Nextthe multiloop control part 110 judges whether VET (N) of the stream conversion table is memorized in the storage area of the stream matching information table generation part 111 (S2008)When memorizingCxL is added to first_pts of VET (N)and last_pts (S2010).

[0271]It points to the multiloop control part 110 so that the stream conversion table VET (N) may be multiplexed to the multiplexing part 114 at a transport streamand it notifies the multiplex starting position wpthe bit rates B and PIDand table_id_extension (S2012)and it moves from it to S2014. In S2008when it judges that VET (N) of a stream conversion table is not memorizedthe multiloop control part 110 points to it and combines multiplex [of the null packets for S_VET and the same size] with the multiplexing part 114and notifies the multiplex starting position wp and the bit rate B. The multiplexing part 114 carries out multiplex [of the null packets] to a transport stream (S2018)and it moves from it to S2014.

[0272]In S2014the multiloop control part 110 calculates wp=wp+ {S_VET/B}adds "1" to the value of the VET counter j (S2015)and compares the value of the VET counter j with the value of the number of times R of repetition multiplex of the stream conversion table VET (N) (S2016). It moves to S2102 at the time of j=Rand returns to S2006 at the time of j<R.

[0273]In S2102the multiloop control part 110 makes the number C of the circumference the quotient (integral part) of i/Tand considers the contents number N as remainder (integer) of i/T. Nextit judges whether there are any contents of the contents number N with reference to the content identifier assignment table of the structure information storage part 109 (S2104)and directs multiplex [of the bit stream of image data VE (N)] to the multiplexing part 114 at a certain time. Under the present circumstancesthe bit rate Bv (N) is calculated and it notifies to the multiplexing part 114 with the value of "PID" and "stream_id" which recorded Bv (N) on the multiplex starting position wp and the display image information identifier assignment table 801. The multiplexing part 114 carries out multiplex [of image data VE (N)] to a transport stream (S2106).

[0274]Nextthe multiloop control part 110 directs multiplex [of the navigation information table NVT (N)] to the multiplexing part 114. Under the present circumstancesthe bit rate Bn (N) is calculated and Bn (N) is notified to the multiplexing part 114 with the multiplex starting positions wp and PID and table_id_extension. The multiplexing part 114 carries out multiplex [of the navigation information table NVT (N)] to a transport stream (S2108).

[0275]The multiloop control part 110 calculates the multiplex starting position wp. wp=wp+ {S_VE(N)+S_NVT (N)} /B (S2110).

1is added to the contents counter i (S2112)and it returns to S2004. In S2104when it judges with there being nothingthe multiloop control part 110 directs multiplex [of the null packets for the size of S_VE(0)+S_NVT (0)] with the multiplex starting position wp and the bit rate B. The multiplexing part 114 carries out multiplex [of the null packets of the directed quantity] to a transport stream (S2114).

[0276]It asks for the multiplex starting position wp by wp=wp+{S_VE(0)+S_NVT(0)}/B (S2116)and the multiloop control part 110 moves from it to S2112. To a multiplexed stream when the number of times R of repetition multiplex of the stream conversion table VET (N) is set to "1"for exampleas shown in <u>drawing 64</u> by the above operations. When R is set to "16"a

transport stream as shown in drawing 70 which multiplexed NITRATetc. to the multiplexed stream as shown in drawing 65 will be transmitted.

2-2-7. As more than the conclusion explainedthe data source 101 of this example assigns an identifierand into a transport streamcarry out multiplex [of the image data which constitutes each contents and the navigation information]and it carries out repeating transmission.

[0277]The auxiliary screen information for displaying an identifier of the image data of contentsan identifier of navigation informationa menuetc. by which the hyperlink was carried outand the script for a screen change etc. are contained in navigation information. Thereforeaccording to navigation informationthe data receiver 121 can specify an identifier from a transport streamcan take out arbitrary contentscan be reproducedand can realize dialogism with the channel of one way.

2-2-8. In additionimage data may be a video data although the case which is 2-2-8-1. where image data was a still picture in this example was described. When image data is a video datafirst_ptsof (several 1)The formula of "last_pts"the formula of length L of the stream of (several 2)The formula of the bit rate Bv (N) assigned to image data VE (N) of (several 3)the formula of the bit rate Bn (N) assigned to the navigation information table NVT of (several 4) (N) -- andThe formula which re-calculates the multiplex starting position wp after multiplexing image data VE (N) and the navigation information table NVT (N) in the multiloop control part 110 is realizable by changing as followsfor example.

[0278]The bit rate Bv (N) which assigns image data VE (N) in the case of an animation expects and determines increment when changing into a transport stream on the basis of the bit rate defined beforehand by video elementalist ream. The remainder which lengthened the bit rate Bv (N) assigned to image data VE (N) from the whole bit rate B can be assigned to the navigation information table NVT (N).

[0279]At this timethe value of "first_pts" of image data VE (N) is calculable according to (several 5).

[0280]

[Equation 5]

[0281]HoweverBv(x) the bit rate assigned to image data VE(x)
S_VE_FIRST(x)MAX {AB} expresses the value of the larger one for size when
the frame of the beginning of image data VE(x) is changed into a transport
stream according to an MPEG 2 system standard among A and Brespectively. In
the case of an animationit does not correspond as for "last_pts" with "first_pts"for
exampleit can be searched for by (several 6).

[0282]

[Equation 6]

[0283]HoweverN_FRAME(X) expresses the frame number of video data
VE(X)and FRAME_PER_SEC expresses the frame number (for exampleif it is
NTSC system 29.97) for 1 second. In the case of an animationthe multiloop
control part 110 updates wp according to (several 7)after pointing to multiplex [of
VE(X) and NE(X)] to the multiplexing part 114 at this time.

[0284]

[Equation 7]

[0285]Although it is needed as composition which is 2-2-8-2. and from which the
transport stream 1701 is generated one by one by the multiplexing part 114
among the air time of an event in this data source 101The multiplexing part 114
generates and memorizes the transport stream of only length L of one cyclein the
case of transmission of the transmission section 106 in data receiver 121 gradeit
repeats and reads this transport streamcarries out predetermined processingand
may be made to carry out repeating transmission.

Although it carried out multiplex [of the image data corresponding in this example and navigation information table which are 2-2-8-3.] to the same time it is not necessary to consider it as the same time. Since it enables it to dissociate individually respectively as mentioned above multiplex [of a navigation information table and the image data corresponding to this] may be carried out to respectively separate time.

2-3. As explained using drawing 49 out of the MPEG2 transport stream transmitted from the data source 101 according to user's operation the data receiver 121 data receiver 121 takes out contents interactively and is reproduced.

2-3-1. The receive section 122 receive section 122 receives the MPEG2 transport stream corresponding to the identifier of the transport stream specified by the reception control part 126 and outputs to the TS decoder part 123.

2-3-2. The TS decoder part 123 TS-decoder part 123 It has the filter condition storage parts store 131 which memorizes the filter condition set up by the reception control part 126 According to this filter condition out of the transport stream outputted from the receive section 122 only the image data which has the specified identifier or voice data is separated and it outputs to the AV decoder part 124. The table data which has the specified identifier is separated and it outputs to the field secured into the receiving data storage part 125 according to the identifier. PCR (reference clock information) of the specified identifier is separated and it outputs to the AV decoder part 124. Two or more filter conditions are simultaneously memorizable and the TS decoder part 123 can be parallel to the filter condition storage parts store 131 and can perform two or more separation to it.

[0286] Drawing 74 (a) and (b) is a figure showing the example of the filter condition table memorized by the filter condition storage parts store 131. Each line of the filter condition table 2201 shows one filter condition. The number which identifies each filter condition is written in the "filter identification number" column 2202. In making each filter condition into a start state when "START" uses a halt condition STOP is set to the "START/STOP" column 2203. The TS decoder

part 123 performs separation based on the filter condition of a start stateand does not perform separation based on the filter condition of the halt condition. The value of PID of the data separated by each filter condition is set to the "PID" column 2204. The value of stream_id of the data separated by each filter condition is set to the "stream_id" column 2205. The value of table_id_extension of the data separated by each filter condition is set to the "table_id_extension" column 2206. When the value "-" is set as the "PID" column 2204the "stream_id" column 2205and the "table_id_extension" column 2206dissociatingwhatever condition nothingi.e.the value of the identifiermay be is shown. The output destination change which outputs the separated data is set to the "output destination change" column 2207.

[0287]The line corresponding to the filter identification number "0" of the filter condition table 2201 shows the filter condition of image data. The AV decoder part 124 is set to the "output destination change" column 2207and "table_id_extension" 2206 cannot be set to it. PID of the image data which should be separated by the reception control part 126and the value of stream_id are set to 2204 "stream_id" 2205.

[0288]The line corresponding to a filter identification number "1" shows the filter condition of voice data. The AV decoder part 124 is set to the "output destination change" column 2207and a value cannot be set to the "table_id_extension" column 2206. PID of the voice data which should be separated by the reception control part 126and the value of stream_id are set to the "PID" column 2204 and the "stream_id" column 2205.

[0289]The line corresponding to a filter identification number "2" shows the filter condition of the stream conversion table VET. "Output destination change" The stream matching information table storage part 132 is set as 2207and a value cannot be set to the "stream_id" column 2205. PID of the stream conversion table which should be separated by the reception control part 126and the value of table_id_extension are set to the "PID" column 2204 and the "table_id_extension" column 2206.

[0290]The line corresponding to a filter identification number "3" shows the filter condition of the navigation information table. The navigation information table storage part 133 is set to the "output destination change" column 2207and a value cannot be set to the "stream_id" column 2205. PID of the navigation information table which should be separated by the reception control part 126and a value with table_id_extension are set to the "PID" column 2204 and the "table_id_extension" column 2206.

[0291]"START" or "STOP" is set to the "START/STOP" column 2203 of each filter condition by the reception control part 126and the separation of the TS decoder part 123 is set as a start state or a halt condition. The filter condition storage parts store 131 has memorized the filter condition which is not illustrated for [other than these] system-information tablessuch as NITSDTEITPATand PMTand PCR (reference clock information).

[0292]The filter condition of the image data on the filter condition table 2201 and corresponding to a filter identification number "0"And the filter condition of the voice data corresponding to a filter identification number "1" is set as the halt condition by the reception control part 126and the TS decoder part 123 does not perform separation of image data and voice data at this time. The filter condition of the stream conversion table VET on the filter condition table 2201 and corresponding to a filter identification number "2"The value of "PID" is set as "0x0083"the value of "table_id_extension" is set as "0x0005" by the reception control part 126and the START/STOP column 2203 is set as the start state. At this timethe TS decoder part 123 out of the transport stream 1801 shown in drawing 70 transmitted from the transmission section 106. Separate the stream conversion table VET according to the set-up filter condition (5)the stream matching information table storage part 132 is made to memorizeand it notifies to the reception control part 126. The contents of VET (5) are as having been shown in drawing 63 (a).

[0293]The filter condition of the navigation information table NVT on the filter condition table 2201 and corresponding to a filter identification number "3"The

value of "PID" is set as "0x0084"the value of "table_id_extension" is set as "0x0005" by the reception control part 126and the START/STOP column 2203 is set as the start state. At this timethe TS decoder part 123 separates the navigation information table NVT according to the filter condition set up out of the transport stream 1801 shown in drawing 70 transmitted from the transmission section 106 (5)The navigation information table storage part 133 is made to memorizeand it notifies to the reception control part 126. The contents of the navigation information table NVT (5) are as having been shown in drawing 61.

[0294]In the filter condition table 2208"0x0084" and "stream_id" are set as "0xe5" by the reception control part 126andas for the filter condition of the image data corresponding to a filter identification number "0"PIDis set as the start state. At this timethe TS decoder part 123 out of the transport stream 1801 shown in drawing 70 transmitted from the transmission section 106. It separates into the order which received image data VE (5) according to the set-up filter conditionimage data VE (21)image data VE (37)and image data VE (53)and outputs to the AV decoder part 124. It is dependent on the timing to which the reception control part 126 sets this filter condition as a start state which image data is first separated among four image data. By setting this filter condition as a halt condition to suitable timingthe reception control part 126 separates only one of the beginnings of the four image dataand can output to the AV decoder part 124.

2-3-3. The AV decoder part 124 AV-decoder part 124 has a clock part which is not illustrated. This clock part is set as right reference time with the value of PCR (reference clock information) outputted from the TS decoder part 123and counts the time used as the standard for decoding image data and voice datataking the right synchronization.

[0295]Image data to which the AV decoder part 124 was outputted from the TS decoder part 123 or voice data. Or if the both are receivedaccording to directions of the reception control part 126the identifier of the image data written in the private area and voice data will be read firstand it will notify to the reception

control part 126. Nextwhile outputting to the regenerating section 128decoding image data and voice data for every decoding unitand taking a synchronization by a clock part according to directions of the reception control part 126completion of decoding is notified to the reception control part 126.

2-3-4. The composition receiving data storage part 125 of the receiving data storage part 125 is provided with the following.

For exampleit comprises RAM etc. and is the stream matching information table storage part 132.

Navigation information table storage part 133.

System-information table storage part 134.

[0296]The stream matching information table storage part 132 has memorized the stream conversion table separated in the TS decoder part 123. The navigation information table storage part 133 has memorized the navigation information table separated in the TS decoder part 123. The system-information table storage part 134 has memorized system-information tables separated in the TS decoder part 123such as NITSDTEITPATand PMT.

2-3-5. The signal receive section 127 signal receive section 127 receives the signal of remote-control-operation Hitoshia useretc.and notifies to the reception control part 126.

2-3-6. According to the directions from the reception control part 126the regenerating section 128 regenerating section 128The graphics information included in the navigation information table outputted to the image data decoded in the AV decoder part 124 from the reception control part 126 is piled upit outputs to the indicator 129and the voice data decoded in the AV decoder part 124 is outputted to the voice output part 130.

2-3-7. CRTa liquid crystal displayetc. realize and the indicator 129 indicator 129 displays the picture outputted from the regenerating section 128. The contents 151 and 152 and the 153 grades which were shown by <u>drawing 49</u> are displayed.

2-3-8. It realizes by a loudspeaker etc. and the voice output part 130 voice output

part 130 outputs the sound outputted from the regenerating section 128.

2-3-9. The reception control part 126 reception control part 126 controls the receive section 122and makes a desired transport stream receive. The filter condition of the navigation information table which should be divided into the next with reference to the navigation information table memorized to the present navigation information table storage part 133 if a user's manipulate signal is received via the signal receive section 127The filter condition of the stream conversion table for acquiring image data is set as the filter condition storage parts store 131 of the TS decoder part 123. It dissociates in the TS decoder part 123and the filter condition of image data is set as the filter condition storage parts store 131 with reference to the stream conversion table memorized by the stream matching information table storage part 132.

[0297]The image data separated by the TS decoder part 123 judges the reception control part 126 with reference to the image data identifier in which it was written by the private area of image data whether it is suitable image data. At the time of suitable image datait decodes in the AV decoder part 124and it is outputted to the regenerating section 128. When it is not suitable image datathe conditions of the filter condition storage parts store 131 are changedand separation of a stream conversion table is directed again.

[0298]The bit map data of the object contained in the navigation information table separated by the TS decoder part 123 is readand it notifies to the regenerating section 128and is made to display on image data in piles.

2-3-9-1. The initial control reception control part 126It is constituted by CPU and the program which controls this and by a user. When the event to which multiplex [of the send data memorized by the send data storage parts store 102 in the transport stream which the transmission section 106 of the data source 101 transmits] was carried out is chosen firstFirstthe MPEG 2 system standard of being used with the common digital-satellite-broadcasting receiving setAnd it points to reception of the transport stream which the transmission section 106 transmits with reference to a system-information table according to the procedure

defined by the DVB-SI standard to the receive section 122and separation of PMT corresponding to the selected event is directed in the TS decoder part 123.

[0299]Nextwith reference to PMT currently recorded on the system-information table storage part 134the reception control part 126 acquires the identifier of PCRand sets it as the filter condition storage parts store 131. The reception control part 126 acquires the image data of entry contentsand an identifier with navigation informationand sets them to the filter condition of the stream conversion table of the filter condition storage parts store 131and the filter condition of a navigation information tablerespectively.

[0300]The reception control part 126 refers to PMT in the system-information table storage part 134Acquire the value of PID of the component which transmits a stream conversion tableand the component which transmits a navigation information tableandrespectively The filter condition of the stream conversion table of the filter condition storage parts store 131It is set as the filter condition of a navigation information tableand these filter conditions are set as a start state.

[0301]The reception control part 126 will set the filter condition of the stream conversion table of the filter condition storage parts store 131 as a halt conditionif the notice of separation of a stream conversion table is received from the TS decoder part 123. Nextwith reference to the stream conversion table in the stream matching information table storage part 132the reception control part 126 reads the value of "stream_id" of image dataand sets up the filter condition of the image data of the filter condition storage parts store 131. Nextthe stream conversion table in the stream matching information table storage part 132 is referred toThe value of PID corresponding to the value of "component_tag" which read the value of "component_tag" and was further read with reference to PMT in the system-information table storage part 134 is acquiredThe filter condition of the image data of the filter condition storage parts store 131 is set upand this filter condition is set as a start state.

2-3-9-2. Although PID of the same value as the image data which is propriety judgment of image data and as for which the data source 101 differs in

pluralityand stream_id may be given and it may transmitAfter transmission of the stream conversion table corresponding to a certain image dataIt has transmitted so that the image data may appear ahead of PID of the same valueand other image data with stream_id after fixed time. By thisIf the reception control part 126 completes setting out of the filter condition of image data within [after receiving a stream conversion table] fixed timeThe TS decoder part 123 separates desired image data without an errorand can output it to the AV decoder part 124.

[0302]NextIt is investigated whether the reception control part 126 is in agreement with the identifier of the image data which is going to acquire the value of the image data identifier described by the private area of the image data outputted from the TS decoder part 123 via the AV decoder part 124and it is going to acquire now. PID of a component which sets the filter condition of the image data of the filter condition storage parts store 131 as a halt conditionand transmits a stream conversion table to the filter condition of a stream conversion table when not in agreementThe identifier of the image data which it is going to acquire now is set upand the filter condition of a stream conversion table is made into a start state. The value of the identifier "table_id_extension" of a stream conversion table is the same as the value of the identifier "VE_id" of image data. Therebyeven when delay occurs in the processing to which the reception control part 126 sets the filter condition of image data with reference to a stream conversion table by a certain causeit can prevent displaying another image data accidentally.

[0303]The value of the identifier described by the private area of image data where the reception control part 126 was outputted from the TS decoder part 123When a value with the identifier of the image data which it is going to acquire now is in agreementthe value of "first_pts" is read with reference to the stream conversion table in the stream matching information table storage part 132. And it is confirmed whetherwith reference to the clock part of the AV decoder part 124the notice of the completion of decoding of a frame will come from the AV decoder part 124 by the time of the value of read "first_pts." PID of a component

which sets the filter condition of the image data of the filter condition storage parts store 131 as a halt conditionand transmits a stream conversion table to the filter condition of a stream conversion table when there is no notice of the completion of decodingThe identifier of the image data which it is going to acquire now is resetand the filter condition of a stream conversion table is made into a start state.

[0304]Therebyeven when delay occurs in the processing to which the reception control part 126 sets the filter condition of image data with reference to a stream conversion table by a certain causeit can prevent the beginning of image data going out and being reproduced from the middle. When the notice of the completion of decoding of a frame comes from the AV decoder part 124the reception control part 126 reads the value of "last_pts" with reference to the stream conversion table in the stream matching information table storage part 132. And if the time of the value of read "last_pts" comes with reference to the clock part of the AV decoder part 124the filter condition of the image data of the filter condition storage parts store 131 will be set as a halt condition. Therebyonly desired image data is separated and it is outputted to the AV decoder part 124. Thereforeother image data with same PID and stream_id is not separated.

2-3-9-3. Generation and the reception control part 126 of graphics information will set the filter condition of the navigation information table of the filter condition storage parts store 131 as a halt conditionif the notice of separation of a navigation information table is received from the TS decoder part 123. Nextthe reception control part 126 refers to the object definition table in the navigation information table in the navigation information table storage part 133Acquireand an index value continuously the display coordinates "X" of a button objectand "Y" about the button of "0." The index value of "Focused Bitmap" about the other button. The index value of "Normal Bitmap" is acquiredthe bit map data corresponding to an index value is acquired with reference to a bit map tablethe graphic soot information on a button is generated based on theseand it outputs to the regenerating section 128.

An interpretation and the reception control part 126 of 2-3-9-4. user's operation initialize variable cur_focus showing the index value of the button object in the present selective state to "0."

[0305]The reception control part 126 will judge whether the signal of a user's operation is a "top"or it is the "bottom" "decision"if the signal of a user's operation is received from the signal receive section 127. the signal of a user's operation -- "-- upper" -- or -- "-- the time of being lower" -- the value of variable cur_focus -- "1" -- it decreases or increases. Nextwith reference to the navigation information table in the navigation information table storage part 133an object definition table is referred to firstAcquire the display coordinates "X" of a button objectand "Y"and about a button with an index value equal to the value of variable cur_focuscontinuously. The index value of "Focused Bitmap" about the other button. The index value of "Normal Bitmap" is acquiredwith reference to a bit map tablethe bit map data corresponding to an index value is acquiredthe graphic soot information on a button is generated based on theseand it outputs to the regenerating section 128.

[0306]When the signal of a user's operation is "decision"The reception control part 126 refers to the object definition table of the navigation information table NVT memorized by the navigation information table storage part 133An index value acquires the index value of the hair drier of a button object equal to the value of variable cur_focusand an instruction word is read from the hair drier corresponding to an index value with reference to a hair drier definition table. When an instruction word is "goto_contents"the index value of an argument is read further and the identifier of the contents of the link destination corresponding to the read index value is read as an identifier of the contents reproduced next with reference to a hyperlink table.

[0307]When an instruction word is "goto_entry"with reference to PMT of the event to which the navigation information table of the contents under present reproduction in the system-information table storage part 134 belongsthe identifier of entry contents is read as an identifier of the contents reproduced next.

2-3-9-5. When the identifier of the contents reproduced next and the identifier of the contents reproduced now are equalcarry out no setting-out reception control parts 126 of a filter condition. Nextwhen original_network_id and transport_stream_id of the contents to reproduce differ from the transport stream which has received nowAccording to the procedure defined by the MPEG 2 system standard and the DVB-SI standardreception of a desired transport stream is directed to the receive section 122 with reference to a system-information table. When the specified transport stream is a thing belonging to another network as operation of the receive section 122it processes changing direction of an antenna etc. and the specified transport stream is received.

[0308]When the event to which the image data of the contents reproduced next belongs differs from the event to which the image data of the contents reproduced now belongsthe reception control part 126The identifier of PMT of the event to which the image data of the contents similarly reproduced next with reference to a system-information table belongs is set as the filter condition storage parts store 131 of the TS decoder part 123.

[0309]The TS decoder part 123 separates PMT according to a filter conditionand the system-information table storage part 134 is made to memorize itand it is notified to the reception control part 126. The reception control part 126 will set the value of "PCR_PID" as the filter condition storage parts store 131 with reference to the PMTif the notice of separation of PMT of the event to which image data belongs is received from the TS decoder part 123.

[0310]The event to which the navigation information of the contents which reproduce the reception control part 126 next belongsAlso when it differs from the event to which the navigation information of the contents reproduced now belongsThe identifier of PMT of the event to which the navigation information of the contents similarly reproduced next with reference to a system-information table belongs is set as the filter condition storage parts store 131 of the TS decoder part 123.

[0311]The value of the identifier "VE_id" of the image data of the contents

reproduced next the reception control part 126When it differs from the value of the identifier "VE_id" of the image data of the contents reproduced nowPMT of the event to which the image data of the contents reproduced to the next of the system-information table storage part 134 belongs is referred toPID of the component given to VE_Information_Component_Descriptor is acquiredit is set as the filter condition of the stream conversion table in the filter condition storage parts store 131 with the value of "VE_id"and this filter condition is made into a start state.

[0312]The value of the identifier "NE_id" of the navigation information of the contents reproduced next the reception control part 126When it differs from the value of the identifier "NE_id" of the navigation information of the contents reproduced nowPMT of the event to which the navigation information of the contents reproduced to the next of the system-information table storage part 134 belongs is referred toPID of the component given to NE_Component_Descriptor is acquiredit is set as the filter condition of the navigation information table in the filter condition storage parts store 131 with the value of "NE_id"and this filter condition is made into a start state.

2-3-10. original_network_id by which multiplex was carried out in the example 1801 of a contents display with the data receiver 121for examplethe transport stream of drawing 70by "0x0001." When the event from which transport_stream_id identifies service_id by "0x0001"it is identified by "0x0001"and event_id is discriminated by "0x0001" is first chosen by the userWith reference to NIT1301 which shows drawing 66 (a) the reception control part 126 according to the procedure defined by the MPEG 2 system standard and the DVB-SI standardoriginal_network_id is "0x0001"transport_stream_id acquires the information on transmission clue originsuch as frequency etc. of the transport stream 1801 identified by "0x0001"Point to reception of the transport stream 1801 to the receive section 122and with reference to PAT1401 similarly shown in drawing 67program_nois equal to the value of service_idnamelyacquires the value "0x0080" of PID of PMT of the program of

"0x0001"This is set as the filter condition of PMT in the filter condition storage parts store 131.

[0313]The TS decoder part 123 separates PMT1501 shown in drawing 68and the system-information table storage part 134 is made to memorize itand it is notified to the reception control part 126. From PMT1501 memorized by the system-information table storage part 134the reception control part 126 reads the value "0x0081" of "PCR_PID"and sets it as the filter condition of PCR in the filter condition storage parts store 131. Nextthe reception control part 126 refers to Entry_Descriptor shown in drawing 69 (a) in PMT1501The value "0x0005" of "entry_VE_id" is taken out and it is set as "table_id_extension" of the filter condition of the stream conversion table in the filter condition storage parts store 131. Nextthe reception control part 126 acquires the value "0x0083" of PID of the component given to VE_Information_Component_Descripor from PMT1501It is similarly set as "PID" of the filter condition of a stream conversion tableand the filter condition of a stream conversion table is made into a start state.

[0314]Nextthe reception control part 126 refers to Entry_Descriptor shown in drawing 69 (a) in PMT1501The value "0x0005" of "entry_NE_id" is taken out and it is set as "table_id_extension" of the filter condition of the navigation information table in the filter condition storage parts store 131. Nextthe reception control part 126 acquires the value "0x0082" of PID of the component given to NE_Component_Descripor from PMT1501It is similarly set as "PID" of the filter condition of a navigation information tableand the filter condition of a navigation information table is made into a start state.

[0315]While the TS decoder part 123 separates the stream conversion table 1201 shown in drawing 63 (a)making the stream matching information table storage part 132 memorize it and notifying to the reception control part 126Separate the navigation information table 1001 shown in drawing 61the navigation information table storage part 133 is made to memorizeand it notifies to the reception control part 126.

[0316]The reception control part 126 will refer to the stream conversion table

1201 of the stream matching information table storage part 132if the notice of separation of a stream conversion table is receivedThe value "0xe5" of "stream_id" is acquired and it is set as the filter condition storage parts store 131 at "stream_id" of the filter condition of image data. Nextthe value "0x00" of "component_tag" is acquired from the stream conversion table 1201. Furthermore with reference to PMT1501 in the system-information table storage part 134the value of "component_tag" was given to stream_identifier_descriptor of "0x00." The kind of data transmitted acquires the value "0x0084" of "PID" of the component which is image datasets it as "PID" of the filter condition of the image data in the filter condition storage parts store 131and makes this filter condition a start state.

[0317]When it changes to a stream conversion table at the value of "component_tag" and the direct "PID" value is indicatedWithout referring to PMTthe reception control part 126 acquires the value of "stream_id" and "PID" from a stream conversion tableand sets up the filter condition of the image data in the filter condition storage parts store 131.

[0318]The TS decoder part 123 separates the bit stream 901 of the image data shown in drawing 60and outputs it to the AV decoder part 124. The bit stream 901 of image data writes the value "0x0005" of "VE_id" in the private area of the still picture data 201 shown in drawing 53 (a). The reception control part 126 receives the notice of the value "0x0005" of the identifier written in the private area of the separated image data via the AV decoder part 124It checks that it is in agreement with the value "0x0005" previously set as table_id_extension of a stream conversion table. Nextreferring to the clock part of the AV decoder part 124 by the time of the value "112500" of "first_pts" of the stream conversion table 1201A check of the notice of a success with decoding of image data successful from the AV decoder part 124 will set the filter condition of the image data of waiting and the filter condition storage parts store 131 as a halt condition for the time of the value "112500" of "last_pts" of the stream conversion table 1201.

[0319]If the notice of separation of a navigation information table is receivedthe

reception control part 126Firstthe display coordinates of the button corresponding to [set variable cur_focus as "0" and] an index value "0" with reference to the navigation information table 1001 of the navigation information table storage part 133The bit map data corresponding to the index value of "Focused Bitmap"The display coordinates of the button corresponding to an index value "1" and the bit map data corresponding to the index value of "Normal Bitmap" are acquiredthe graphics information on a button is generatedand it outputs to the regenerating section 128. The regenerating section 128 piles up the graphics information outputted to the image data outputted from the AV decoder part 124 from the reception control part 126and displays on the indicator 129 the display image 2301 shown in drawing 75 (a).

[0320]When a user inputs a "lower" signal in the state where the display image 2301 is displayedusing operating memberssuch as a remote controlthe reception control part 126 receives the notice of an input signal "bottom" via the signal receive section 127 first1Increases the value of variable cur_focusand is set to "1." Nextthe display coordinates of the button corresponding to an index value "0" with reference to the navigation information table 1001 of the navigation information table storage part 133The bit map data corresponding to the index value of "Normal Bitmap"The bit map data corresponding to the display coordinates of the button corresponding to an index value "1" and the index value of "Focused Bitamap" is acquiredthe graphics information on a button is generatedand it outputs to the regenerating section 128. The regenerating section 128 piles up the graphics information outputted to the image data outputted from the AV decoder part 124 from the reception control part 126and displays on the indicator 129 the display image 2302 shown in drawing 75 (b).

[0321]When a user inputs the signal of "decision" in the state where the display image 2301 is displayedusing operating memberssuch as a remote controlthe reception control part 126The notice of an input signal "decision" is received via the signal receive section 127The index value of the object definition table 1002 of the navigation information table 1001 of the navigation information table

storage part 133 acquires the index value "0" of the hair drier of the button which is a value "0" of variable cur_focusWith reference to the hair drier definition table 1003the script instruction word "goto_contents" corresponding to an index value "0" and the index value "0" of the argument are acquired.

[0322]Nextthe reception control part 126 takes out the value "0x0001" of "VE_id" of the contents of the link destination corresponding to an index value "0" with reference to the hyperlink table 1004It is set as "table_id_extension" of the filter condition of the stream conversion table in the filter condition storage parts store 131. Nextthe reception control part 126 acquires the value "0x0083" of PID of the component given to VE_Information_Component_Descripor from PMT1501It is similarly set as "PID" of the filter condition of a stream conversion tableand the filter condition of a stream conversion table is made into a start state.

[0323]Nextthe reception control part 126 takes out the value "0x0001" of "NE_id" of the contents of the link destination corresponding to an index value "0"and sets it as "table_id_extension" of the filter condition of the navigation information table in the filter condition storage parts store 131. Nextthe reception control part 126 acquires the value "0x0082" of PID of the component given to NE_Component_Descripor from PMT1501It is similarly set as "PID" of the filter condition of a navigation information tableand the filter condition of a navigation information table is made into a start state.

[0324]While the TS decoder part 123 separates the stream conversion table 1202 shown in drawing 63 (b)making the stream matching information table storage part 132 memorize it and notifying to the reception control part 126Separate the navigation information table 1101 shown in drawing 62the navigation information table storage part 133 is made to memorizeand it notifies to the reception control part 126.

[0325]The reception control part 126 directs separation of image data in the TS decoder part 123 with reference to the stream conversion table 1202if the notice of separation of a stream conversion table is received from the TS decoder part 123. If the notice of separation of a navigation information table is received from

the TS decoder part 123with reference to the navigation information table 1101the graphics information on a button will be generated and it will output to the regenerating section 128.

[0326]The regenerating section 128 piles up the graphics information outputted to the image data outputted from the AV decoder part 124 from the reception control part 126and displays on the indicator 129 the display image 2303 shown in drawing 75 (c). When a user inputs the signal of "decision" in the state where the display image 2301 is displayedusing operating memberssuch as a remote controlthe reception control part 126The notice of an input signal "decision" is received via the signal receive section 127and the script instruction word "goto_entry" is acquired with reference to the navigation information table 1101 of the navigation information table storage part 133. .Nextthe reception control part 126 from PMT1501 memorized by the system-information table storage part 134. The value "0x0005" of "entry_VE_id" is taken out and "table_id_extension" of the filter condition of the stream conversion table in the filter condition storage parts store 131 is set up.

[0327]Nextthe reception control part 126 acquires the value "0x0083" of PID of the component given to VE_Information_Component_Descripor from PMT1501PIDof the filter condition of a stream conversion table is set up similarlyand the filter condition of a stream conversion table is made into a start state. With reference to PMT1501the reception control part 126 takes out the value "0x0005" of "entry_NE_id"and sets up "table_id_extension" of the filter condition of the navigation information table in the filter condition storage parts store 131. Nextthe reception control part 126 acquires the value "0x0082" of PID of the component in which NE_Component_Descripor was given from PMT1501PIDof the filter condition of a navigation information table is set up similarlyand the filter condition of a navigation information table is made into a start state.

[0328]While the TS decoder part 123 separates the stream conversion table 1201 shown in drawing 63 (a)making the stream matching information table

storage part 132 memorize it and notifying to the reception control part 126Separate the navigation information table 1001 shown in drawing 61the navigation information table storage part 133 is made to memorizeand it notifies to the reception control part 126.

[0329]The reception control part 126 directs separation of image data in the TS decoder part 123 with reference to the stream conversion table 1201if the notice of separation of a stream conversion table is received from the TS decoder part 123. If the notice of separation of a navigation information table is received from the TS decoder part 123with reference to the navigation information table 1001the graphics information on a button will be generated and it will output to the regenerating section 128.

[0330]The regenerating section 128 piles up the graphics information outputted to the image data outputted from the AV decoder part 124 from the reception control part 126and displays on the indicator 129 the display image 2301 shown in drawing 75 (a).

2-3-11. Below operation of the data receiver 121 explains operation of the data receiver 121 using the flow chart shown in drawing 76 - drawing 79.

2-3-11-1. Explain operation of the whole operation place ** and the whole data receiver 121 using drawing 76.

[0331]If the reception control part 126 is put into the power supply of the data receiver 121 by the userAccording to the procedure defined by the MPEG 2 system standard and the DVB-SI standardcontrol the receive section 122 and the TS decoder part 123and a system-information table is receivedA race card is displayed on the indicator 129 by the regenerating section 128operating memberssuch as a remote controlare used for a userand a program is made to choose. If the selection signal from an operating member is notified via the signal receive section 127The send data memorized by the send data storage parts store 102 in the transport stream transmitted from the transmission section 106 of the data source 101 chooses the event by which multiplex was carried outThe identifier of the eventoriginal_network_idtransport_stream_idservice_idand

event_id are obtained (S2402).

[0332]If the event to which multiplex [of the send data memorized by the send data storage parts store 102] was carried out is chosenthe reception control part 126A system-information table is referred to according to the procedure defined by the MPEG 2 system standard and the DVB-SI standardIt points to reception of the transport stream transmitted from the transmission section 106 to the receive section 122and separation of PMT corresponding to the selected event is directed in the TS decoder part 123. The receive section 122 receives the transport stream transmitted from the transmission section 106and outputs to the TS decoder part 123. The TS decoder part 123 separates PMT corresponding to the selected eventwrites it in the system-information table storage part 134 in the receiving data storage part 125and is notified to the reception control part 126. When the notice of PMT reception is received from the TS decoder part 123the reception control part 126 acquires PID of PCRand the filter condition storage parts store 131 is made to memorize it with reference to PMT in the system-information table storage part 134 (S2404).

[0333]The reception control part 126 sets up original_network_id of the event chosen as variable cur_original_network_idtransport_stream_id of the event chosen as variable cur_transport_stream_id is set upservice_id of the service chosen as variable cur_VE_service_id and variable cur_NE_service_id is set upevent_id of the event chosen as variable cur_VE_event_id and variable cur_NE_event_id is set upand variable cur_VE_id and variable cur_NE_id are cleared. These variables show the information on the identifier of the contents reproduced now (S2406). Nextthe reception control part 126 sets up original_network_id of the event chosen as variable new_original_network_idtransport_stream_id of the event chosen as variable new_transport_stream_id is set upservice_id of the service chosen as variable new_VE_service_id and variable new_NE_service_id is set upevent_id of the event chosen as variable new_VE_event_id and variable new_NE_event_id is set upWith reference to PMT in the system-information table storage part 134the

value of entry_VE_id and entry_NE_id is set to variable new_VE_id and variable new_NE_idrespectively (S2408).

[0334]Nextthe reception control part 126 performs the spawn process of contents. The details of a contents spawn process are mentioned later (S2410). Nextthe reception control part 126 clears the content change flag showing a contents change being in a required state to "0" (S2412). Nextthe reception control part 126 waits for the signal input of the selection operation from a user notified from the signal receive section 127 (S2414). If the reception control part 126 has an input of a signal from the signal receive section 127it will process an user entry signal. The details about processing of an user entry signal are mentioned later (S2416). nextthe reception control part 126 judges whether "1" is set as the content change flag (S2418)when "1" is set upit returns to S2410and when not "1" coming outit returns to S2414.

2-3-11-2. Explain the details of a contents spawn processnext the contents spawn process of S2410 using the flowchart of drawing 77.

[0335]Firstthe reception control part 126 has the same value of new_original_network_id and cur_original_network_id which are the variable which self has memorizedAnd it is judged whether the value of variable new_transport_stream_id and cur_transport_stream_id is the same (S2502). At the time of affirmationit is parallel in the changing process (S2504) of image dataand the changing process (S2506) of navigation informationand deed processing is ended. At the time of denialthe spawn process to the transport stream identified by variable new_original_network_id and variable new_transport_stream_id with reference to a system-information table is performed (S2508)The value of variable new_original_network_id is set as variable cur_original_network_idThe value of variable new_transport_stream_id is set as variable cur_transport_stream_idVariable cur_VE_service_idvariable cur_VE_event_idClear variable cur_VE_idvariable cur_NE_service_idvariable cur_NE_event_idand variable cur_NE_id (S2510)and The changing process (S2504) of image dataIt is parallel in the changing process (S2506) of navigation

informationand deed processing is ended.

2-3-11-3. Explain the details of the spawn process of image datanext the changing process of the image data of S2504 using the flow chart of drawing 78.

[0336]The reception control part 126 has the same value of variable new_VE_service_id and cur_VE_service_id which self has memorizedAnd it is judged whether the value of variable new_VE_event_id and cur_VE_event_id is the same (S2602). It judges whether at the time of affirmationthe value of variable new_VE_id and cur_VE_id is the same (S2604)processing is ended at the time of affirmationand it moves to S2610 at the time of denial. When the judgment of S2602 is denialvariable new_VE_service_idSeparation of PMT corresponding to the event identified by variable new_VE_service_id and variable new_VE_event_id with reference to the system-information table corresponding to new_VE_event_id is directed in the TS decoder part 123. The TS decoder part 123 separates specified PMTwrites it in the system-information table storage part 134 in the receiving data storage part 125and is notified to the reception control part 126. If the notice of separation of PMT is receivedthe reception control part 126 will acquire PID of PCR with reference to PMT which receivedand will set it as the filter condition storage parts store 131 (S2606). The reception control part 126 sets the value of variable new_VE_service_id as variable cur_VE_idand sets the value of variable new_VE_event_id as variable cur_VE_event_id (S2608).

[0337]The reception control part 126 Variable cur_VE_service_id in the system-information table storage part 134PMT corresponding to the event identified by cur_VE_event_id is referred toPID of the component given to VE_Information_Component_Descriptor is acquiredIt is set as the filter condition of a stream conversion table by making the value of variable new_VE_id into table_id_extensionand this filter condition is set as a start state. The TS decoder part 123 separates the stream conversion table VET corresponding to the value of variable new_VE_id out of a transport stream according to a filter conditionand the stream matching information table storage part 132 is made to memorize itand it is notified to the reception control part 126 (S2610).

[0338]Nextthe reception control part 126 interprets the stream conversion table VET acquired by S2610 in the stream matching information table storage part 132The value of "first_pts" is set as the variable firstPTSthe value of "last_pts" is set as the variable lastPTSand the value of "stream_id" and "component_tag" is acquired (S2612). Nextthe flag "first_flag" which shows whether decoding of the frame of the beginning of image data completed the reception control part 126 is initialized to "0" (S2614).

[0339]The reception control part 126 Nextvariable cur_VE_service_id in the system-information table storage part 134The kind of data transmitted with reference to PMT corresponding to the event identified by cur_VE_event_id by image data. PID of the component given to stream_identifier_descriptor equal to the value of "component_tag" which the value of "component_tag" acquired by S2612 is acquiredIt is set as the filter condition of the image data in the filter condition storage parts store 131 with the value of "stream_id" acquired by S2612and this filter condition is set as a start state. The TS decoder part 123 separates image data according to a filter conditionand outputs it to the AV decoder part 124 (S2616).

[0340]The reception control part 126 acquires the value of the identifier of the image data described by the private area of the image data to which it pointed in the AV decoder part 124and which the TS decoder part 123 separatedand compares with the value of variable new_VE_id (S2618). When in agreement and not in agreement to S2620it moves to S2619. The reception control part 126 sets the filter condition of the image data in the filter condition storage parts store 131 as a halt condition (S2619)and returns to S2610.

[0341]The AV decoder part 124 will notify completion of decoding to the reception control part 126if decoding of the image data outputted from the TS decoder part 123 is completed. It is judged whether the reception control part 126 received this completion notification (S2620). When it receives and has not received to S2622it moves to S2624. The reception control part 126 sets the value "1" as flag first_flag (S2622).

[0342]The reception control part 126 acquires the present time by 1/90000 second bit with reference to the value of the clock part of the AV decoder part 124and compares with the value of the variable firstPTS (S2624). When the value of the present time is beyond the variable firstPTSat the time below itit moves to S2626 S2628. The reception control part 126 judges whether the value of flag first_flag is "1" (S2626)and it moves from it to S2619 at the time of "0"andin the case of "1"moves S2628.

[0343]In S2628the reception control part 126 acquires the present time by 1/90000 second bit with reference to the value of the clock part of the AV decoder part 124and compares with the value of the variable lastPTS. When the value of the present time is beyond the variable lastPTSThe filter condition of the image data in the filter condition storage parts store 131 is set as a halt condition (S2630)The value of variable new_VE_id is set as variable cur_VE_id (S2632)and regeneration of image data is endedand when the value of the present time is less than the variable lastPTSit returns to S2620.

2-3-11-4. Explain the details of the changing process of navigation informationnext the changing process of the navigation information of S2506 using the flow chart of drawing 79.

[0344]The reception control part 126 has the same value of variable new_NE_service_id and cur_NE_service_id which self has memorizedAnd it is judged whether the value of variable new_NE_event_id and cur_NE_event_id is the same (S2702). It judges whether at the time of affirmationthe value of variable new_NE_id and cur_NE_id is the same (S2704)processing is ended at the time of affirmationand it moves to S2706 at the time of denial. When the judgment of S2702 is denialvariable new_NE_service_idWith reference to the system-information table corresponding to new_NE_event_idseparation of PMT corresponding to the event identified by variable new_NE_service_id and variable new_NE_event_id is directed in the TS decoder part 123. The TS decoder part 123 separates specified PMTrecords it on the system-information table storage part 134 in the receiving data storage part 125and is notified to the reception

control part 126 (S2708).

[0345]The reception control part 126 sets the value of variable new_NE_service_id as variable cur_NE_service_idand sets the value of variable new_NE_event_id as variable cur_NE_event_id (S2710). The reception control part 126 in S2706 Variable cur_NE_service_id in the system-information table storage part 134PMT corresponding to the event identified by cur_NE_event_id is referred toPID of the component given to NE_Component_Descriptor is acquiredIt is set as the filter condition of the navigation information table of the filter condition storage parts store 131 by making the value of variable new_NE_id into table_id_extensionand this filter condition is set as a start state. The TS decoder part 123 separates the navigation information table NVT corresponding to the value of variable new_NE_id out of a transport stream according to a filter conditionrecords it on the navigation information table storage part 133and is notified to the reception control part 126 (S2706).

[0346]The reception control part 126 refers to the object definition table of the navigation information table NVT acquired by S2706 in the navigation information table storage part 133Acquire the display coordinates "X" of a button objectand "Y"and acquire the index value of "NormalBitmap" continuouslyand a bit map table is referred toThe bit map data corresponding to an index value is acquiredthe graphic soot information on a button is generated based on theseand it outputs to the regenerating section 128. The regenerating section 128 piles up this graphic soot informationand the indicator 129 is made to display it on the image data which the AV decoder part 124 decoded (S2712).

[0347]The reception control part 126 initializes variable cur_focus showing the index value of the button object in the present selective state to "0" (S2714). The reception control part 126 refers to the object definition table of the navigation information table NVT acquired by S2706The display coordinates "X" of a button object with an index value equal to the value of variable cur_focusAcquire "Y"and acquire the index value of "Focused Bitmap" continuouslyand a bit map table is referred to. Acquired the bit map data corresponding to an index valueand made

into the bit map of a selective state the bit map of the button which has an index value corresponding to the value of variable cur_focus based on these. The graphics information on a button object is generated and it outputs to the regenerating section 128. The regenerating section 128 on the image data which the AV decoder part 124 decodedPile up this graphic soot informationit is made to display on the indicator 129 (S2716)the value of variable new_NE_id is set as variable cur_NE_id (S2718)and the spawn process of navigation information is ended.

Processing of a user's input signal of processing of a 2-3-11-5. user's input signalnext S2416 is explained using the flow chart of drawing 80.

[0348]The reception control part 126 judges whether a user's input notified from the signal receive section 127 is a "top" signal. At the time of a "top" signalwhen that is not rightit moves to S2804 S2808 (S2802). "1" In S2804the reception control part 126 reduces the value of variable cur_focus. Howeverwhen the value of variable cur_focus is "0"it is considered as as ["0"].

[0349]The reception control part 126 refers to the object definition table of the navigation information table NVT acquired by S2706 memorized by the navigation information table storage part 133The display coordinates "X" of a button object with an index value equal to the value of variable cur_focusAcquire "Y"and acquire the index value of "Focused Bitmap" continuouslyand a bit map table is referred toAcquire the bit map data corresponding to an index valueand the bit map of a button which has an index value corresponding to the value of variable cur_focus based on these is made into the bit map of a selective stateThe graphics information on a button object which made the bit map of the button corresponding to the index value corresponding to the value of variable cur_focus the bit map of the normal state similarly is generatedand it outputs to the regenerating section 128. On the image data decoded in the AV decoder part 124the regenerating section 128 piles up this graphic soot informationis made to display it on the indicator 129 (S2806)and ends user entry processing.

[0350]In S2808the reception control part 126 judges whether a user's input

notified from the signal receive section 127 is a "bottom" signal. At the time of a "bottom" signalwhen that is not rightit moves to S2810 S2812. "1" In S2810the reception control part 126 increases the value of variable cur_focus. Howeverwhen the value of variable cur_focus is equal to the maximum of the identifier of the button object in the navigation information table NVTit moves to S2806 as remaining as it is.

[0351]In S2812the reception control part 126 judges whether a user's input notified from the signal receive section 127 is a "definite" signal. At the time of a "definite" signalto S2814when that is not righta user's input process is ended. In S2814the reception control part 126 refers to the object definition table of the navigation information table NVTAn index value acquires the index value of the hair drier of a button object equal to the value of variable cur_focusand an instruction word is read from the hair drier corresponding to an index value with reference to a hair drier definition table. When an instruction word is "goto_contents"when that is not rightit moves to S2818 S2824 (S2816).

[0352]In S2818the reception control part 126 reads the index value of the argument of a goto_contents command from a hair drier. The reception control part 126 refers to the hyperlink table of said navigation information tableoriginal_network_id of the identifier of the contents corresponding to the index value read by S2818transport_stream_idVE_service_idVE_event_idVE_idNE_service_idThe value of NE_event_id and NE_idrespectively Variable new_original_network_idIt is set as new_transport_stream_idnew_VE_service_idnew_VE_event_idnew_VE_idnew_NE_service_idnew_NE_event_idand new_NE_id. Howeverthe value is not set up all over the hyperlink tablei.e.each original value is not changed about the identifier of "-" (S2820).

[0353]The reception control part 126 sets the value of a content change flag as "1" (S2822)and ends a user's signal processing. In S2824the reception control part 126 judges whether a script instruction word is "goto_entry"and ends user

signal processing at the time of no. At the time of "goto_entry"the reception control part 126Variable cur_NE_service_id in the system-information table storage part 134PMT corresponding to the event identified by cur_NE_event_id is referred toThe value of "entry_VE_id" and "entry_NE_id"Set it as variable new_VE_id and variable new_NE_idand Variable new_VE_service_idThe value of variable cur_NE_service_id and variable cur_event_id is set as variable new_VE_event_idrespectively (S2826)and it moves to it S2822.

[0354]As mentioned aboveaccording to a user's operationa display change is carried out at the display image 2303 shown in drawing 75 (c)and the display image 2301 shown in drawing 75 (a) returns.

2-3-12. As more than the conclusion explainedthe data receiver 121 of this example can extract the presentation information and navigation information of specific contents required for reproduction from a transport streamwhen required. Therebyaccording to a user's operationthe contents of a link destinationetc. can be reproduced suitablyand it becomes possible to sponsor a program with the dialogism according to user's operation using the channel of one way.

Timeout: The process for displaying translation results will be terminated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The example of two or more contents reproduced while changing with a receiving set is shown.

[Drawing 2]It is the figure to which the left-hand side of drawing 1 was expanded.

[Drawing 3]It is the figure to which the right-hand side of drawing 1 was expanded.

[Drawing 4]It is a lineblock diagram in a 1st embodiment of the digital

broadcasting system of a digital broadcasting system and receiving set concerning this invention.

[Drawing 5]An example of two or more contents which constitute an interactive program is shown.

[Drawing 6]It is a figure showing the example of the video data and voice data which are memorized by the presentation information storage part.

[Drawing 7]It is a figure showing an example of the navigation information memorized by the navigation information storage parts store of the above-mentioned embodiment.

[Drawing 8]It is a figure showing an example of the navigation information memorized by the navigation information storage parts store of the above-mentioned embodiment.

[Drawing 9]It is a figure showing an example of the navigation information memorized by the navigation information storage parts store of the above-mentioned embodiment.

[Drawing 10]It is a figure showing an example of the navigation information memorized by the navigation information storage parts store of the above-mentioned embodiment.

[Drawing 11]It is a figure showing an example of the navigation information memorized by the navigation information storage parts store of the above-mentioned embodiment.

[Drawing 12]It is a figure showing an example of the structure information table memorized by the structure information storage part of the above-mentioned embodiment.

[Drawing 13]It is a figure showing an example of the entry information memorized by the structure information storage part of the above-mentioned embodiment.

[Drawing 14]It is a figure showing an example of the multiplex information table memorized by the multiplex information storage parts store of the above-mentioned embodiment.

[Drawing 15]It is a figure showing an example of the content identifier assignment

table which the multiloop control part of the above-mentioned embodiment creates.

[Drawing 16]It is a figure showing an example of the version number assignment table which the multiloop control part of the above-mentioned embodiment creates.

[Drawing 17]It is a figure showing an example of the navigation information table generated by the navigation information table generation part of the above-mentioned embodiment.

[Drawing 18]It is a figure showing an example of the navigation information table generated by the navigation information table generation part of the above-mentioned embodiment.

[Drawing 19]It is a figure showing an example of the navigation information table generated by the navigation information table generation part of the above-mentioned embodiment.

[Drawing 20]It is a figure showing an example of the navigation information table generated by the navigation information table generation part of the above-mentioned embodiment.

[Drawing 21]It is a figure showing an example of the navigation information table generated by the navigation information table generation part of the above-mentioned embodiment.

[Drawing 22]They are NIT generated by the system-information table generation part of the above-mentioned embodimentSDTand a figure showing an example of EIT.

[Drawing 23]It is a figure showing an example of PAT generated by the system-information table generation part of the above-mentioned embodiment.

[Drawing 24]It is a figure showing an example of PMT generated by the system-information table generation part of the above-mentioned embodiment.

[Drawing 25]It is a figure showing the details of Entry_Descriptor in PMT generated by the system-information table generation part of the above-mentioned embodiment.

shown in drawing 37 more to details.

[Drawing 40]It is a flow chart which shows the navigation information change processing shown in drawing 37 more to details.

[Drawing 41]It is a flow chart which shows the dialog control management by navigation information.

[Drawing 42]It is a flow chart which shows the user I/F processing by navigation information.

[Drawing 43]The example of other interactive programs which consist of the four contents 10-13 is shown.

[Drawing 44]The navigation information corresponding to the contents 10 is shown.

[Drawing 45]The navigation information corresponding to the contents 11 is shown.

[Drawing 46]The navigation information corresponding to the contents 12 is shown.

[Drawing 47]The navigation information corresponding to the contents 13 is shown.

[Drawing 48]The navigation information corresponding to the four contents 10-13 is shown.

[Drawing 49]It is a figure showing the example of the contents displayed on the display screen of a receiver as one frame.

[Drawing 50]It is a figure showing typically the send data transmitted from the transmitting side.

[Drawing 51]It is a figure showing typically the situation of transmission of the send data transmitted from the transmitting side.

[Drawing 52]It is a lineblock diagram of the data source and the data receiver of a digital broadcasting system in a 2nd embodiment of this invention.

[Drawing 53]It is a figure showing the example of the image data memorized by the presentation information storage part.

[Drawing 54]It is a figure showing an example of the navigation information

memorized by the navigation information storage parts store.

[Drawing 55]It is a figure showing an example of the navigation information memorized by the navigation information storage parts store.

[Drawing 56]It is a figure showing an example of the structure information table and entry information which are memorized by the structure information storage part.

[Drawing 57]It is a figure showing an example of the multiplex information table memorized by the multiplex information storage parts store.

[Drawing 58]It is a figure showing an example of the content identifier assignment table which a multiloop control part creates.

[Drawing 59]It is a figure showing an example of the display image information identifier assignment table which a multiloop control part creates.

[Drawing 60]An identifier information adjunct is a figure showing the state where VE_id was added to the bit stream private area of image data.

[Drawing 61]It is a figure showing an example of the navigation information table generated by the navigation information table generation part.

[Drawing 62]It is a figure showing an example of the navigation information table generated by the navigation information table generation part.

[Drawing 63]It is a figure showing the example of the stream conversion table generated by the stream matching information table generation part.

[Drawing 64]It is one mimetic diagram of the transport stream multiplexed by the multiplexing part.

[Drawing 65]They are other mimetic diagrams of the transport stream multiplexed by the multiplexing part.

[Drawing 66]They are NIT generated by the system-information table generation partSDTand a figure showing the example of EIT.

[Drawing 67]It is a figure showing an example of PAT generated by the system-information table generation part.

[Drawing 68]It is a figure showing an example of PMT generated by the system-information table generation part.

[Description of Notations]

5101 Digital broadcasting system

5102 Send data storage parts store

5103 Data multiplexing part

5103 Multiplexing part

5104 Multiplex information storage parts store

5105 System-information table generation part

5106 Transmission section

5107 Presentation information storage part

5108 Navigation information storage parts store

5109 Structure information storage part

5110 Multiloop control part

5111 Navigation information table generation part

5112 Multiplexing part

5121 Receiving set

5122 Receive section

5123 TS decoder part

5124 AV decoder part

5125 Receiving data storage part

5126 Reception control part

5127 Signal receive section

5128 Regenerating section

5129 Indicator

5130 Voice output part

5131 Filter condition storage parts store

5132 Navigation information table storage part

5133 System-information table storage part